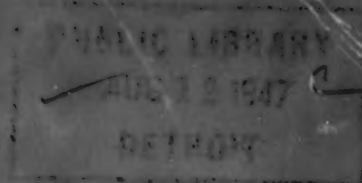


TECHNOLOGY DEPARTMENT



MODERN PLASTICS



AUGUST 1947

★ *New Pages from the DUREZ Diary*



● A new material gives this chair strength a big man can trust forever and weight a small woman can shift with one hand.

The chair, recently announced by the Semco Furniture Corp., can't "wear," can't chip, can't lose its silky-smooth finish or collect hard-to-get-at-dust. Its rich red back and its seat of brownish gold with interesting fiber-patterns can never fade or become dull. They're made from Durez impregnated Co-Ro-Lite* plastic, which means that all their attractive features

are permanently molded in

Co-Ro-Lite illustrates the desirable combinations of properties obtained by using Durez phenolic resins with familiar materials. In this case the originator, Columbian Rope Company, forms fluffy batts of long, tough, resilient cordage fibers. These are impregnated with a Durez resin to produce a high-impact plastic compound that is moldable to almost any design.

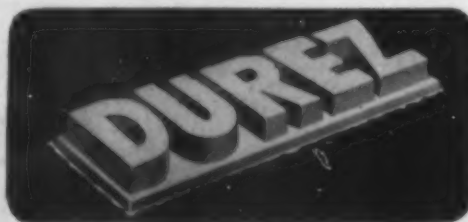
If you're thinking that new materials mean new products, or products that sell faster and serve better, con-

sider the Durez resins. Used as impregnating or bonding agents, they adapt wood, fabric, or other materials to applications that hold new profit opportunities.

Our 26 years of experience as specialists in phenolics... the most versatile of resins and molding compounds... is readily available. Whether or not you have passed the planning stage, call on us freely.

Durez Plastics & Chemicals, Inc., 58 Walck Road, North Tonawanda, New York.

* Patented



PHENOLIC
RESINS

MOLDING COMPOUNDS

INDUSTRIAL RESINS

PROTECTIVE COATING RESINS

PHENOLIC PLASTICS THAT FIT THE JOB

TECHNOLOGY DEPARTMENT

PUBLIC LIBRARY
AUG 12 1947
DETROIT



Catalin... LOVELINESS THAT SELLS!

"Life has loveliness to sell," enthused the poet, deeply moved by the wonders in Nature. "All beautiful and splendid things." Here, against a backdrop of natural beauty, is loveliness in plastics as exemplified by Catalin—the gem-like cast phenolic. Its matchless color and charm transform the most workaday instrument or tool into a thing of beauty and grace.

A housing of Catalin is a hallmark of quality, for in Catalin there is strength, poise and an unrivalled richness of color. Decoratively it exhibits a charm of surface and a degree of luxury that one would attach only to the allure of

semi-precious stones. Yet Catalin's beauty is readily available by the use of inexpensive, quickly constructed steel arbors. Of all housing materials, Catalin possesses the qualities that prove most essential in accelerating the manufacture and merchandising of new products.

Catalin's rich colors—its beauty, brilliance and many desirable physical properties—all offer much to product designers. Highly developed casting techniques now provide full design freedom in all three dimensions. And whether Catalin's distinguished characteristics be adapted to housings, clocks, book-ends or any one of countless other

product appeals, its selection is always justified by the sales result. Catalin's loveliness sells!

Your next application can have new beauty, too, when Catalin steps into the product picture. Our service staff will be glad to help you in the planning. Inquiries invited!

CATALIN CORPORATION OF AMERICA
ONE PARK AVENUE • NEW YORK 16, N. Y.



CAST RESINS • LIQUID RESINS • MOLDING COMPOUNDS

MODERN PLASTICS



VOLUME 24

AUGUST 1947

NUMBER 12

CONTENTS

General Section

Public relations (Editorial).....	5
Plastic monofilaments are on their way....	89
Color—both pride and problem.....	91
Screening bids for consumer favor.....	93
Woven fabric of vinylidene chloride.....	94
Chemical and salt resistant rope.....	97
Nine plastics improve new accordions.....	98
5 advantages of acetate moth suffocator...	101
Vinyl sheet formed into dispenser-display unit.....	102
Quality jewelry uses cast phenolic.....	104
Five reasons for phenolic in mangles.....	107
Vinyl paste resin.....	108
by M. N. Burleson	
A 4-part polyester impregnated glass mat bucket.....	112
Heat resistance, clarity in acrylic.....	119
Nylon rope heads for new markets.....	121
by Raymond E. Miskelly	
The why and how of dyeing plastics.....	124
A high heat resistant polystyrene.....	127
by Ralph I. Dunlap Jr. and Sanford E. Glick	
A glass-mat material.....	162
A new phenolic photographic tank.....	166
A radio case of veneer-kraft laminate.....	170
Cast phenolic ruled printing plates.....	174
Specimens in acrylic.....	178
Intercommunication sets.....	184
Thermoplastics in tin cans.....	188
Acrylic applicator.....	194

Five transparent displays.....	196
Embossing acrylic.....	198
New thermoset resin.....	226

Plastics-Engineering Section

Molding phenolic parts of target gun.....	131
Friction cutting of plastics.....	135
by H. J. Chamberland	
What to look for in high frequency heat sealing equipment.....	138
by Philip Weiss	
Fast radio assembly.....	180

Technical Section

The effect of pH on the reactivity of resorcinol resins.....	145
by Philip H. Rhodes	
Acrylate polymers in Germany.....	147
Plastics digest.....	150
Technical briefs.....	152
U.S. plastics patents.....	156

News and Features

Plastics products.....	115
Plastics stock molds.....	160
Consumption of plastics materials.....	168
Books and booklets.....	202
New machinery and equipment.....	208
Letters.....	214
News of the industry.....	218

"EXECUTIVE and EDITORIAL OFFICE: 122 E. 42nd St., New York 17, N. Y. Published the 20th of preceding month by Modern Plastics, Inc., at Publication Office: Twentieth and Northampton Sts., Easton, Pa. Entered as second class matter, May 28, 1940, at the Post Office at Easton, Pa., under the act of March 3, 1879." Copyright 1947 by Modern Plastics, Inc. All rights reserved. Subscription \$5.00 a year, \$8.00 for two years in U. S., its possessions and South America. Canadian subscriptions \$5.50 per year. All other countries \$6.00 per year, payable in New York funds.

*Now . . . a new **GEON** series*

The 500 Series Polyblends

**LITTLE OR NO LIQUID PLASTICIZER NEEDED; VERY
SHORT MILLING TIME REQUIRED; CAN BE
PERMANENTLY CEMENTED**

THE new Geon polyblends are colloidal blends of GEON polyvinyl resin and HYCAR American rubber. Outstanding fact about these new materials is that the desired end results are achieved with the use of little or no liquid plasticizer.

Solves Adhesion Problems

Combining the desirable properties of both GEON and HYCAR, the polyblends are particularly useful in applications where adhesion has been a problem. Because the HYCAR American rubber acts as a non-extractible plasticizer, conventional vinyl adhesives may be used with the finished material for a truly permanent bond.

Wide Application

GEON polyblends are now being

produced experimentally. They are especially designed for extruding, calendering, embossing, and press polishing. An outstanding feature of these materials is the unusually short milling time required.

They should find wide application in such fields as upholstery, shoe parts, luggage, handbags, and extruded and molded products.

Write for Information

However, it is believed that the uses for GEON polyblend will go far beyond those mentioned here. We will be glad to work with you on experimental applications. For more information please write B. F. Goodrich Chemical Company, Dept. O-8, Rose Building, Cleveland 15, Ohio. In Canada: Kitchener, Ontario.



B. F. Goodrich Chemical Company

A DIVISION OF
THE B. F. GOODRICH COMPANY

GEON polyvinyl materials • HYCAR American rubber • KRISTON thermosetting resins • GOOD-RITE chemicals

AUGUST • 1947

3

Sound... from every angle

ANOTHER EXAMPLE OF MASTER CRAFTSMANSHIP
IN CHICAGO MOLDED PLASTICS

Sound judgment dictated the use of molded plastics for this huge 30 inch housing for J. P. Seeburg Corporation's wall type speaker. And sound engineering was responsible for its development.

It's a CMPC job from start to finish. The molds were designed and built in the CMPC tool room and are, in themselves, an example of the highest degree of skill.

Compression molded of a black phenolic material, this housing, despite its extraordinary size, is produced in a single piece. It's light in weight and has no objectionable acoustical properties to overcome.

A big job . . . but not too big for CMPC. We're used to the unusual ones . . . large or small . . . injection or compression molded. And we're used to working closely with our customers in the development of molded plastic parts . . . designing and engineering for practical, economical moldability . . . selecting the correct material . . . eliminating the "bugs" . . . to insure the best in molded plastics.

Perhaps that's why so many big names in industry select CMPC . . . and why you, too, will find this a good place to bring your plastics molding problems. Why not discuss your plans with a CMPC Service Engineer . . . now? A letter or phone call will bring prompt action . . . and incurs no obligation.

CHICAGO MOLDED PRODUCTS CORPORATION



1046 N. Kalmar Ave., Chicago 51, Illinois
Branch Offices in Principal Industrial Centers

COMPRESSION and INJECTION
molding of all plastic materials



MODERN PLASTICS



EDITORIAL STAFF

Editor: CHARLES A. BRESKIN
Executive Editor: LAURA E. MORRISON
Technical Editor: DR. GORDON M. KLINE
Engineering Editor: FRED B. STANLEY
Features Editor: R. L. VAN BOSKIRK
Art Director: DONALD R. RUTHER
Midwestern Editor: VAL WRIGHT
Associate Editor: ANITA COMSTOCK
Assistant Editor: VIRGINIA SUE WILSON
London Editor: PAUL REILLY

Write READER'S SERVICE for
plastics information

EXECUTIVE STAFF

Publisher: CHARLES A. BRESKIN
General Manager: ALAN S. COLE
Associate Publisher: HIRAM McCANN

BUSINESS STAFF

Advertising Manager: ALAN S. COLE

P. H. Backstrom	A. M. Rothenberg
M. A. Olsen	Burton W. Gussow
J. M. Connors	Joseph A. Drucker
R. C. Beggs	W. F. Kennedy

Promotion Manager: JOHN G. KASTEN
Production Manager: DANIEL M. BROADS
Ass't. Production Manager: B. J. FARINA

Executive and Editorial Offices:
122 E. 42nd St., New York 17, N. Y.
Tel., MUrray Hill 3-0655

Circulation Department
Circulation Manager: FREDERICK A. KLEIN
32 Broadway, New York 4, N. Y.
Tel., WHitchall 4-4782

Branch Offices
Chicago 1: 221 N. La Salle St.
Manager: J. M. Connors
Tel., Randolph 5588
Cleveland 14: 815 Superior Ave.
Manager: R. C. Beggs
Tel., Superior 0737
Los Angeles 5: 2412 W. 7th St.
Manager: A. M. Rothenberg
Tel., Fairfax 2978

MODERN PLASTICS is fully protected
by copyright and nothing that appears in
it may be reprinted wholly or in part,
without special permission.



Member Audit Bureau of Circulation
MODERN PLASTICS is regularly indexed
in Industrial Arts Index and Industex.

Public relations

Today, the plastics industry is said to be suffering from a temporary set-back. Among other things it is paying the penalty for inexperience, misapplications, extravagant claims and miracle type ballyhoo.

The ballyhoo in particular which, strangely enough, has come from sources other than the plastics industry has raised havoc with the plastics industry's public relations. The industry is in the peculiar position of having secured thousands of columns of free publicity that it fears has been more harmful than helpful.

What to do about it?

The answer, of course, is to give the public a real down-to-earth explanation of what is going on in the plastics industry. But how to do it is a complex problem with many facets.

The most urgent need is for cooperation and coordination among plastics people themselves in a united endeavor to inform the public on the truth about plastics. Let us dispel these plastic fairy tales. Let us give the public a background of information that will enable it to understand the plastics industry. Let us tell the people some of our production problems and let them in on our established manufacturing processes so that they may appreciate our problems and come to a better realization of how plastics are made and thus understand their limitations. Let's not fear to tell them that, like iron or wood, plastics too have certain weaknesses—that the word *plastic* means many things to many people and that there is no one plastic from which you can build an indestructible house, a perfect automobile, a flawless article of wearing apparel. Let us attempt to take the mystery out of plastics and tell the public why plastics is a high-grade material with a myriad of suitable applications.

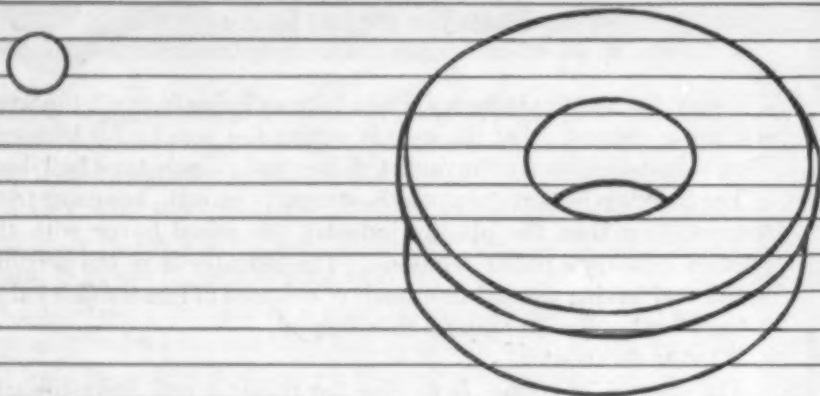
Almost nothing has been done to obtain a meeting of minds in the industry for the purpose of combining their ingenuity to work out a sound public relations program. P.M.M.A. insists that it will be concerned only with technical affairs. S.P.I. has a public relations committee and makes sporadic efforts to do something about it, but is sadly limited by funds—it is simply incredulous to believe that the Society has actually cut its public relations program budget to \$5,000—a sum that is so infinitesimal for the job to be done that it might just as well be said that the budget that is allowed for public relations is zero.

One advertiser alone selling one plastic product spent \$150,000 during three or four spring months and admits he has just started, but the entire industry can only scrape up a few thousand dollars to do a co-operative job which should demand the ultimate that this industry can produce in brains as well as dollars.

Who is going to take the first step in bringing together the interested parties so that they may pool the ingenuity and resources so as to enable the customers for their plastics products to learn the truth about plastics?

Problems solved by Richardson...in Plastics

#1--Non-Corrosive, Abrasion Resisting, Conveyor Wheel.



Problem: To produce a conveyor wheel for a bottle vending machine which would be not only non-corrosive but resistant to the abrasive action of the conveyor chain moving around its periphery and still serve as its own self-lubricating bearing.

Solution: Laminated INSUROK graphitized fabric was recommended and approved for machining to size. After field tests had proved this material selection, quantity production was required and the economies of molding became evident. As Richardson facilities include both operations, INSUROK graphitized molding materials of desirable properties were produced and no lost time was expended in the change-over.

INSUROK Precision Plastics—INSUROK is the family name of a great variety of laminated and molded plastic products produced by Richardson. Laminated INSUROK is available in sheets, rods, tubes, punched and machined parts, made from paper, fabric, melamine, etc. Molded INSUROK products are made from Beetle, Bakelite, Plaskon, Tenite, Styron, Durez, Lucite, etc., by compression, injection and transfer molding.

The RICHARDSON COMPANY

Sales Headquarters: MELROSE PARK, ILL. FOUNDED 1858 LOCKLAND, CINCINNATI 15, OHIO
NEW YORK 4, 75 WEST STREET Sales Offices ROCHESTER 4, N. Y. 1031 SIBLEY TOWER BLDG.
PHILADELPHIA 40, PA., 3728 NO. BROAD STREET MILWAUKEE 3, WIS., 743 NO. FOURTH STREET
CLEVELAND 15, OHIO, 326-7 PLYMOUTH BLDG. • DETROIT 2, MICH. 6-232 G. M. BLDG. • ST. LOUIS 12, MO. 5379 PERSHING AVENUE
Factories: MELROSE PARK, ILL. • NEW BRUNSWICK, N. J. • INDIANAPOLIS, IND.

RICHARDSON MEANS *Versatility* IN PLASTICS

Another new product
from a Du Pont Plastic



PROPHECY... PROFITS!

Shopper-stopper made of Du Pont "Lucite" sells new nylon phonograph needle*



**PRODUCT PACKAGE
COMPLETES SALES TIE-IN**

Decca's new jewel-tipped nylon needle is sold in a package of the same design as its large display unit ... with both the glistening clear dome and blue base molded of Du Pont "Lucite." The beauty of "Lucite" assures eye appeal and its strength provides protection for the needle—from manufacturer to customer. Package molded by Gary Enterprises, Inc., Brooklyn, N. Y.

You don't need a seer to see it. This sparkling display unit is boosting sales of Decca's new sapphire-tipped nylon needle. For both its crystal-clear dome and brilliant blue base are made of Du Pont "Lucite."

The manufacturer chose "Lucite" for its striking appearance, transparency, ease of working, resistance to breakage. In short—he found exactly the right combination of properties in "Lucite."

Every day, more and more products are packaged in "Lucite" acrylic resin. Its beauty, durability and other desirable qualities add up to almost limitless design possibilities. And it's both easy and economical to fabricate or mold.

Look to Du Pont "Lucite" and other Du Pont plastics for materials that may help you. Perhaps you'll find a way to develop a new product or a means of

improving an old one. Write now for literature. E. I. du Pont de Nemours & Co. (Inc.), Room 368, Arlington, N. J.

"Lucite" display unit manufactured by Neo Designs, Inc., New York, N. Y., for Decca Records, Inc., New York, N. Y.

*REG. U. S. PAT. OFF.





How to Mill this Shave Punch Complete in 60 Hours



1

FAST! 6 hours for layout and setup. 25 hours rough cut. 29 hours finish cut. Material: High carbon, high chrome steel. Total: 60 hours blank stock to finished shave punch. That's typical 2D Rotary Head Milling Machine performance.



2

DIRECT! Intricate shapes of punch teeth milled direct in workpiece. No fussing with models or templets. Blueprint was the only guide the operator had or needed. Precision control of all combinations of cutting movements did the rest.



3

ACCURATE! Single setup held chance of error to minimum. Operator relied on built-in precision, control and measuring devices — had no difficulty holding tolerance to $+.0005"$ — $.0000"$.

Photos and information Courtesy of National Cash Register Co.

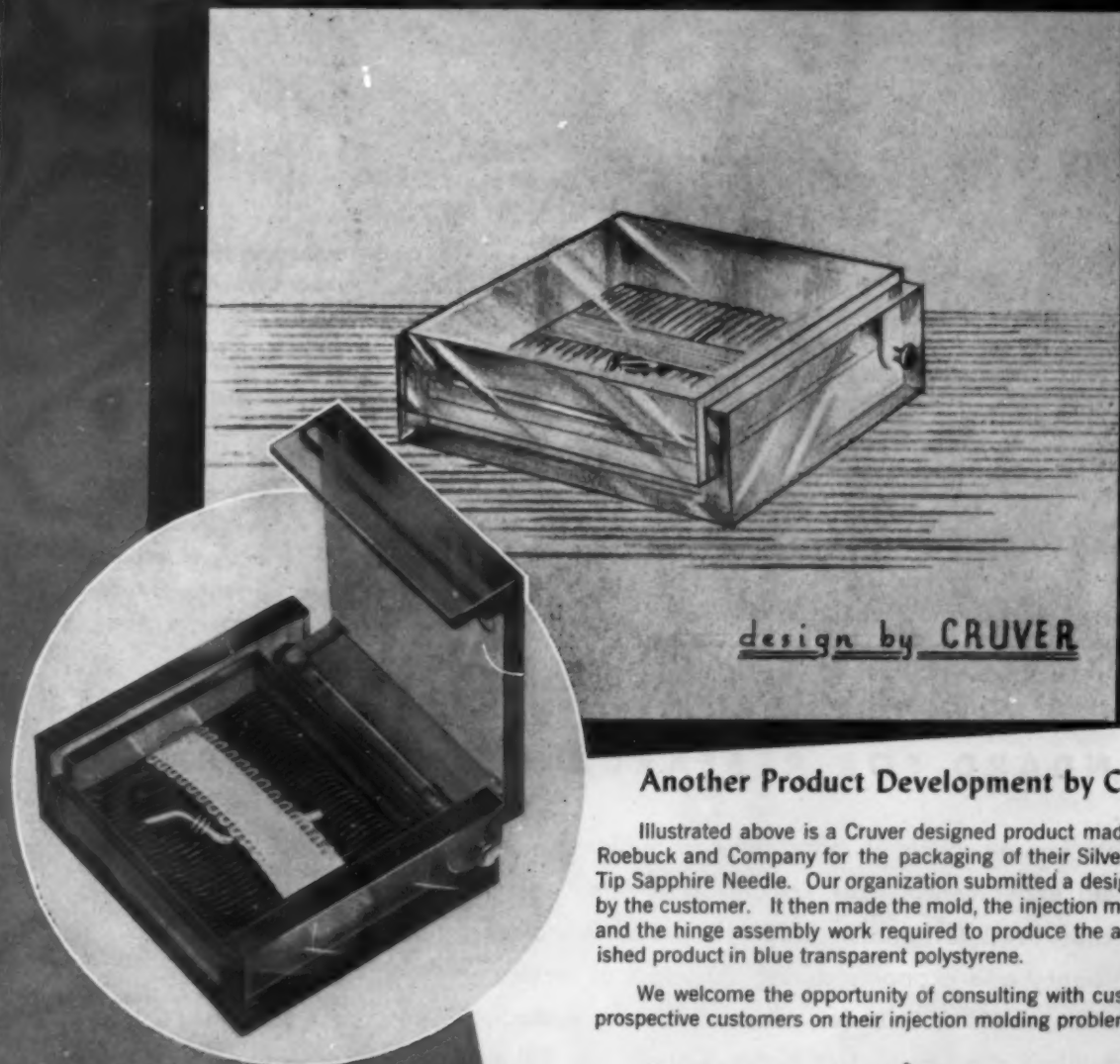
KEARNEY & TRECKER CORPORATION
MILWAUKEE 14, WISCONSIN 4731

4



For the Whole Story of how you can get the benefits of *Fast, Direct, Accurate* results on tough intricate jobs using the Model 2D Rotary Head Milling Machine—send for bulletin 1002C.

PLASTICS for INDUSTRY



Another Product Development by Cruver

Illustrated above is a Cruver designed product made for Sears, Roebuck and Company for the packaging of their Silver-tone Flame Tip Sapphire Needle. Our organization submitted a design approved by the customer. It then made the mold, the injection molded parts, and the hinge assembly work required to produce the attractive finished product in blue transparent polystyrene.

We welcome the opportunity of consulting with customers and prospective customers on their injection molding problems.



51st Year in Plastics . . .
Cruver

MANUFACTURING COMPANY

2456 W. Jackson Blvd., Chicago, Ill., Seeley 1300

New York - 2 W. 46th St. • Wisconsin 7-8847

THE CARVER LABORATORY PRESS



*CLP's
in Use*

... photographed in the plant of
O'Sullivan Rubber Corporation, Win-
chester, Virginia.

O'Sullivan uses the Carver Laboratory Press for production control testing and experimental development work; determining plasticity of raw materials and intermediate mixed stocks. Also determining optimum conditions for press polishing and embossing, and in preparation of samples for various tests requiring accurately dimensioned pieces.

STANDARD FOR RESEARCH AND DEVELOPMENT

Notable improvements in materials and methods have followed experimental work conducted on the Carver Laboratory Press. Original in design, the press has proved its efficiency and economy during 20 years of service. Carver Standard Accessories, all available from stock, include Electric or Steam Hot Plates, Carver Test Cylinders, Swivel Bearing Plates, Cage Equipment, etc. Used for quick, accurate pressing tests; research and instruction work; testing single cavity molds; preparation of samples; and even for small scale production. Send for latest illustrated Catalog.

FRED S. CARVER INC.
HYDRAULIC EQUIPMENT
343 HUDSON ST. NEW YORK 14, N. Y.



The Carver Press is a complete, self-contained hydraulic unit. Accurately controlled pressures to 20,000 lbs.; 6-inch gauge is rigidly mounted on base. Special gauges are available for low pressure work.

THE FIRST FLAME AND HEAT RESISTANT CELLULOSIC PLASTIC

A special formulation of Lumarith*—Celanese* cellulose acetate—is used to injection-mold this housing for the popular Eureka cleaner. It is a revolutionary step in the application of thermoplastics to appliance manufacture, because it brings to industry the famed toughness of the cellulose plus their advantages of lightness, dielectric safety, clear-through color, and high speed moldability.

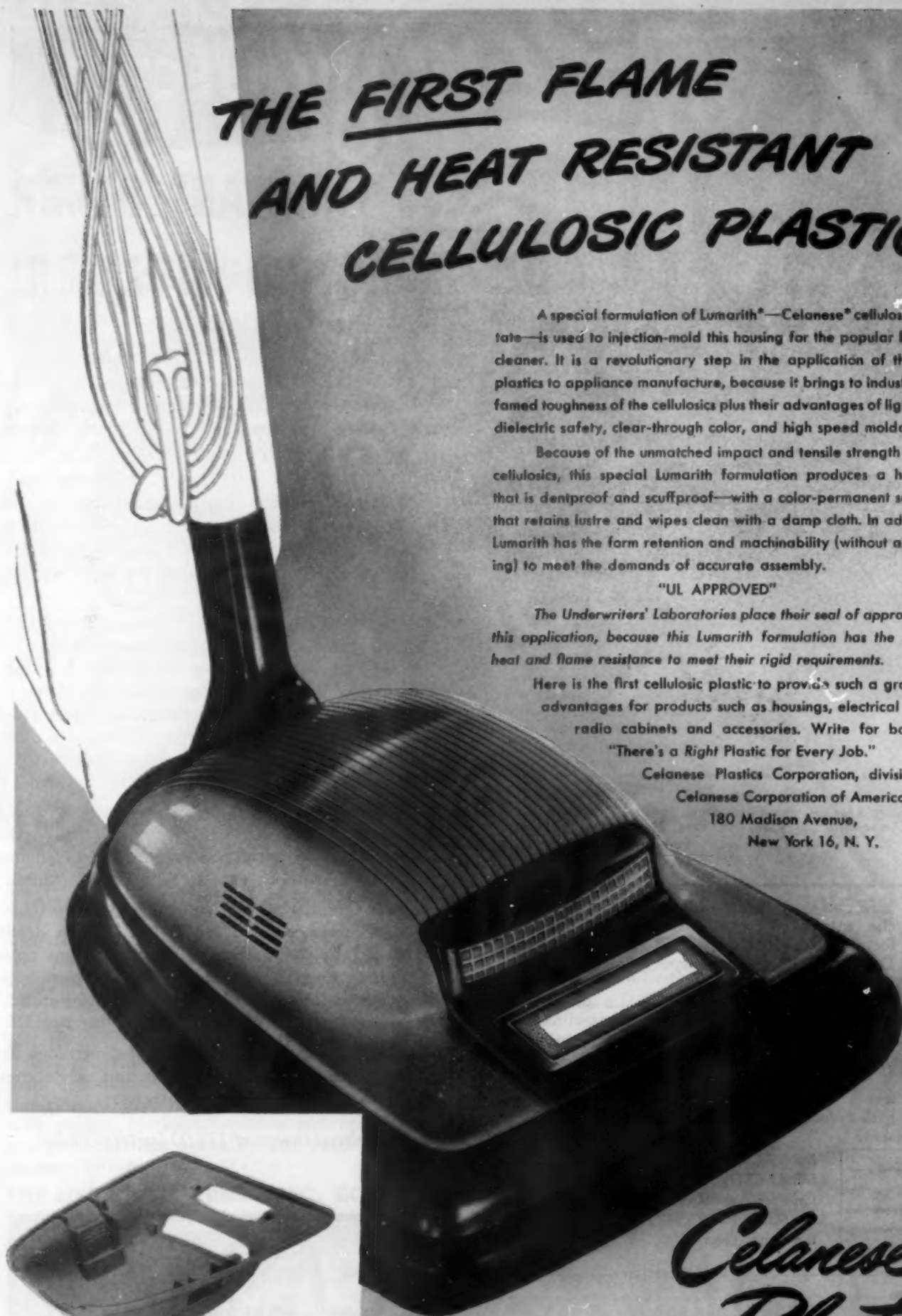
Because of the unmatched impact and tensile strength of the cellulose, this special Lumarith formulation produces a housing that is dentproof and scuffproof—with a color-permanent surface that retains lustre and wipes clean with a damp cloth. In addition, Lumarith has the form retention and machinability (without annealing) to meet the demands of accurate assembly.

"UL APPROVED"

The Underwriters' Laboratories place their seal of approval on this application, because this Lumarith formulation has the added heat and flame resistance to meet their rigid requirements.

Here is the first cellulosic plastic to provide such a group of advantages for products such as housings, electrical parts, radio cabinets and accessories. Write for booklet, "There's a Right Plastic for Every Job."

Celanese Plastics Corporation, division of
Celanese Corporation of America,
180 Madison Avenue,
New York 16, N. Y.



Eureka Housing molded by
Amos Molded Plastics,
Edinburg, Indiana.

*Reg. U. S. Pat. Off.

*Celanese**
Plastics

LUMARITH* FORTICEL* CELLULOID* VINLITE* CELCON*



NEW MINIJECTOR

COSTS LESS THAN ANY OTHER 3/4 OZ. INJECTION MOLDER!

BENCH MODEL

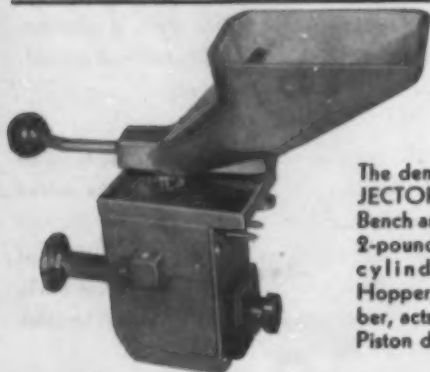
Price . . . \$245

Note simplicity of design, sturdy 22" diameter wheel, easy handling controls. Thermostatic control to 600°F. Thermometer to 800°F.

FLOOR MODEL

(not shown)

Price . . . \$315



INTERCHANGEABLE CYLINDER ASSEMBLY

Price . . . \$75

The demountable heart of the MINIJECTOR. Quick-changes on both Bench and Floor Models. Combines 2-pound capacity hopper, heater, cylinder and injection nozzle. Hopper, directly over heating chamber, acts either as dryer or preheater. Piston diameter is 3/4".

Special tapered, self-locking MOLDING DIE BLANKS are procurable for use with either Bench or Floor Model MINIJECTORS. Dimensions: 2" wide, 4 1/2" long, 2 1/2" high.

Per set in alloy steel . . . \$18.50
Per set in brass . . . 16.50

You can enter your order now by filling out the attached coupon. For additional information write the Moslo Machinery Co., Dept. MPL-8, 2443 Prospect Avenue, Cleveland 15, Ohio.

MOSLO MACHINERY CO., DEPT. MPL-8

2443 Prospect Avenue

Cleveland 15, Ohio

Gentlemen:

Please acknowledge my order for the following:

Quantity		Price*
<input type="text"/>	MINIJECTOR, Bench Model @	\$245
<input type="text"/>	MINIJECTOR, Floor Model @	315
<input type="text"/>	Cylinder Assemblies @	75
<input type="text"/>	Die Blanks, Alloy Steel @	18.50
<input type="text"/>	Die Blanks, Brass @	16.50

Name _____ Position _____

Firm _____

Address _____

City _____ Zone _____ State _____

* All prices F.O.B., Cleveland. Add 7 1/2% for export.

And that's not all—Five additional features make the new MOSLO machine an indispensable addition to progressive molding plants, laboratories and schools:

1 Interchangeable injection units. All-new design permits you to change mold materials or colors in only 3 minutes. It's done by quick-switching demountable cylinder and heater units on main MINIJECTOR frame.

2 Eliminates flush-cleaning. You waste no costly production time or raw materials in flush-cleaning cylinder, hopper and injection nozzle prior to changing mold materials. Merely demount the used injection unit, mount a clean one—and you're ready to resume molding.

3 Handles all thermoplastics. Tests prove that the MINIJECTOR will successfully mold the full range of thermoplastic materials—including Nylon*—without excessive "flash" or "drool."

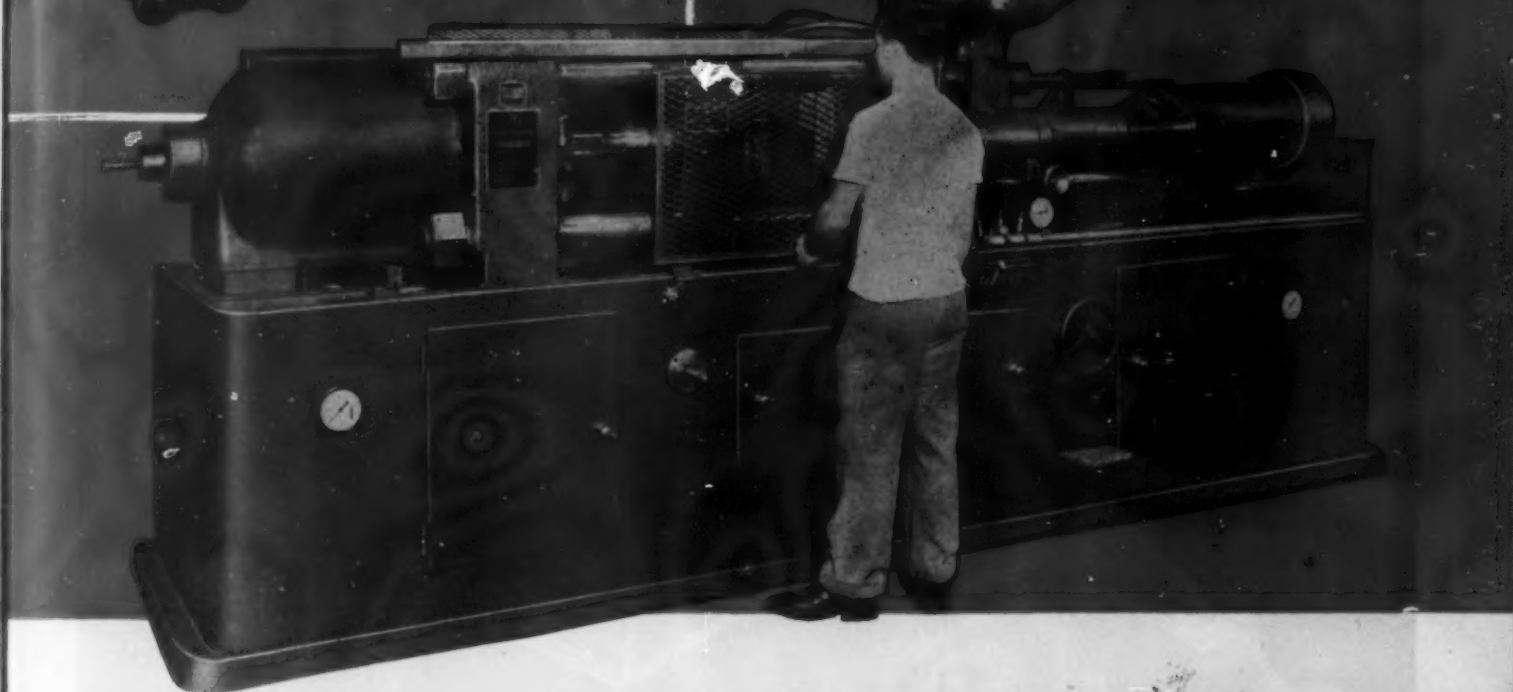
4 Has many uses. The MINIJECTOR is ideally suited to the economical production of color chips, samples, tensile and compression bars, small custom moldings and mold-testing runs.

5 Compactness. Small over-all dimensions demand negligible plant space, permit easy accommodation in crowded laboratories.

Additional charge of \$75.00 for NYLON unit.

MOSLO
MACHINERY CO.
CLEVELAND, OHIO

Production **UP** Change-over time **DOWN**

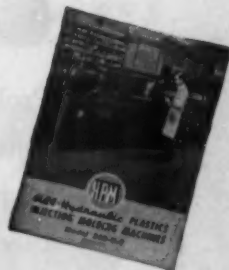


Lionel cuts "down time" with this H-P-M Injection Molding Machine *Investigate NOW!*

Easier, quicker mold changes... simplified setup... no toggle adjustments; all help cut nonproductive time. Output goes UP with an H-P-M Injection Molding Machine on the job, because "down time" is less.

The great dependability of this equipment contributes further to a high production rate. All machine actions are hydraulic, with pumps, boosters, controls and operating mechanism made by one reliable source—H-P-M.

Take a tip from Lionel! Whether you plan to modernize or to add new facilities, get the facts about lower production costs with H-P-M Injection Molding Machines. Each is completely self-contained... connect it to electric power and cooling water and it's ready to go. H-P-M's trained engineers will gladly make recommendations, without obligation. Write today for prices and data on machines to meet your requirements.



THE HYDRAULIC PRESS MFG. COMPANY 1010 Marion Road, Mount Gilead, Ohio, U. S. A.
Branch Offices in New York, Philadelphia, Cincinnati, Cleveland, Columbus, Detroit, Pittsburgh and Chicago. Representatives in other principal cities. Export Dept: 500 Fifth Avenue, New York, N. Y. Cable—"Hydraulic"

Bulletin 4503 describes the latest model H-P-M 9-ounce machine. Ask for a free copy.



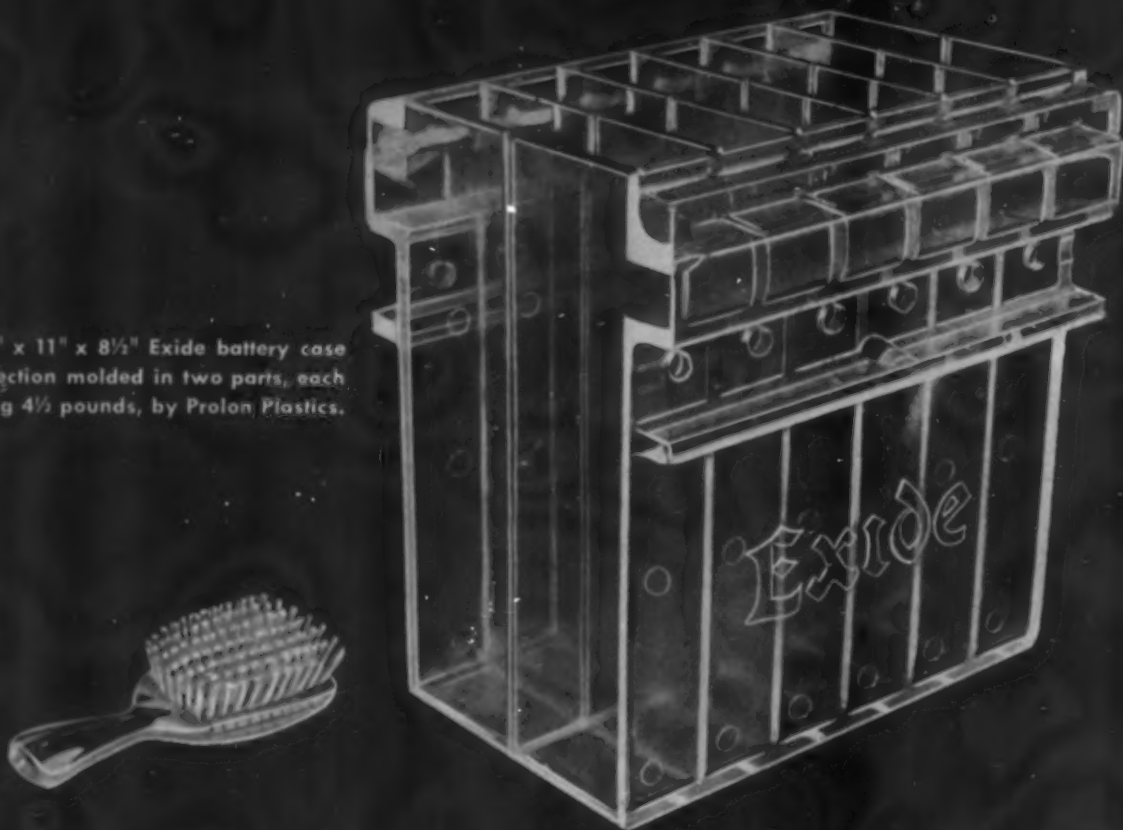
*All-Hydraulic
Self-Contained*

Plastics Molding Presses

REVOLUTIONIZING PRODUCTION WITH HYDRAULICS SINCE 1877

HEAVY SECTION INJECTIONS ARE A PROLON SPECIALTY

This 12" x 11" x 8½" Exide battery case was injection molded in two parts, each weighing 4½ pounds, by Prolon Plastics.



● Prolon Plastics has pioneered in the molding of large pieces. By virtue of constant research, with resulting improvements in techniques and equipment, Prolon is today the nation's largest producer of heavy section injection moldings. Prolon's modern injection plant is equipped to turn out, *in quantity*, moldings ranging in size from a brush back to a battery case (and even larger!) subject to constant scientific production control.

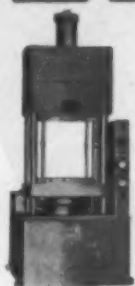
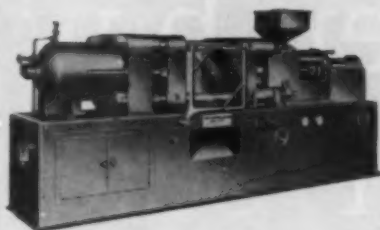
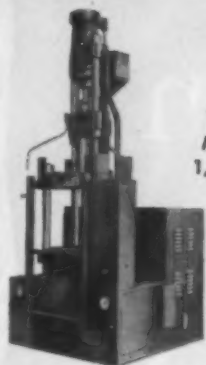
FOR BETTER QUALITY, BETTER SERVICE, WRITE TO

PROLON PLASTICS

A DIVISION OF

PRO-PHY-LAC-TIC BRUSH CO., FLORENCE, MASS.

RESEARCH ★ DEVELOPMENT
DIE-MAKING ★ COMPRESSION
AND INJECTION MOLDING



Only **WATSON-STILLMAN OFFERS THESE SOLUTIONS
TO YOUR MOLDING PROBLEMS:**

- ① The world's most complete, standard line of hydraulic plastics molding equipment.**

Only Watson-Stillman can offer you a complete, standard line of equipment that can meet your every molding need — no matter what process, no matter what plastic material you want to use. And, in addition, Watson-Stillman gives you the benefit of their experience gained through 99 years in building hydraulic machinery. So to get modern production speed and efficiency, ease of operation and maintenance plus the cost advantages

of standard design, specify W-S equipment.

The W-S line includes horizontal and vertical injection machines, transfer machines, compression presses, laboratory presses, automatic tableting machines, hobbing presses, record presses and general purpose presses.

Ask W-S for scientific advice in solving your molding problems, without obligation. Detailed information on all machines sent on request.

3157

FACTORY AND MAIN OFFICE
ROSELLE, NEW JERSEY

BRANCH OFFICES
PHILADELPHIA, PA. • CHICAGO, ILL.

REPRESENTATIVES

BUFFALO, N. Y.	Industrial Equipment Co.
CHICAGO, ILL.	E. L. Essley Machinery Co.
CLEVELAND, O.	Frank T. Goetz Machinery Co.
DALLAS, TEX.	Perry Machinery Co.
DETROIT, MICH.	Peninsular Machinery Co.
DULUTH, MINN.	Anderson Machine Tool Co.
GRAND RAPIDS, MICH.	E. L. Essley Machinery Co.
HOUSTON, TEX.	Perry Machinery Co.
INDIANAPOLIS, IND.	W. K. Millholland Machinery Co.

LOS ANGELES, CAL.	Hoffman and Heatt
MILWAUKEE, WIS.	E. L. Esley Machinery Co.
NEW YORK, N. Y.	Eastern Railway Supplies, Inc. (R. R. Equip.)
PITTSBURGH, PA.	Stanley Berg & Co.
ROCHESTER, N. Y.	Industrial Equipment Co.
SAN FRANCISCO, CAL.	Jenison Machinery Co.
ST. PAUL, MINN.	Anderson Machine Tool Co.
SYRACUSE, N. Y.	Industrial Equipment Co.
TULSA, OKLA.	Perry Machinery Co.
WASHINGTON, D. C.	Ralph Payne (R. R. Equip.)

CANADA: Canadian Fairbanks-Morse Co., Ltd. • Branches in All Principal Cities

Foreign Sales Representatives: OMNI PRODUCTS CORP., 460 Fourth Avenue, New York 16, N. Y. Correspondents Throughout the World

MANUFACTURERS OF THE MOST COMPLETE LINE OF HYDRAULIC MACHINERY

WATSON-STILLMAN

HYDRAULIC MACHINERY DIVISION
Established 1848

A better buy than ever before!

CELLULOSE acetate has always been the standby of molders and designers who want reliable performance at low cost, when the job calls for thermoplastics.

Today, acetate offers outstanding resistance to heat or moisture, giving finished products much greater dimensional stability.

This basic advantage is the result of wartime advances in improved acetate formulations, including a higher degree of acetylation in the acetate itself.

The properties that have kept cellulose acetate at the top—its durability, toughness, absence of odor, and its unsurpassed workability, to name but a few—are now reinforced by this increased dimensional strength. More and more molders are finding it's the best buy in the plastics market!

Hercules does not make cellulosic plastics or molding powder, but supplies the high-quality cellulose derivatives from which they are made. Write for technical details on these base materials.

HERCULES POWDER COMPANY
INCORPORATED
916 Market Street, Wilmington 99, Delaware



Save and Sell with
CELLULOSIC PLASTICS

Cellulose Acetate—Ethyl Cellulose—Nitrocellulose



**CELLULOSE
ACETATE
PLASTICS**

OUTSTANDING PROPERTIES—

*Greatly improved dimensional
stability and durability*

Crystal-clear or colorful

Unaffected by gasoline and oils

Good insulation properties

Can be made fire-resistant

Tough, not brittle

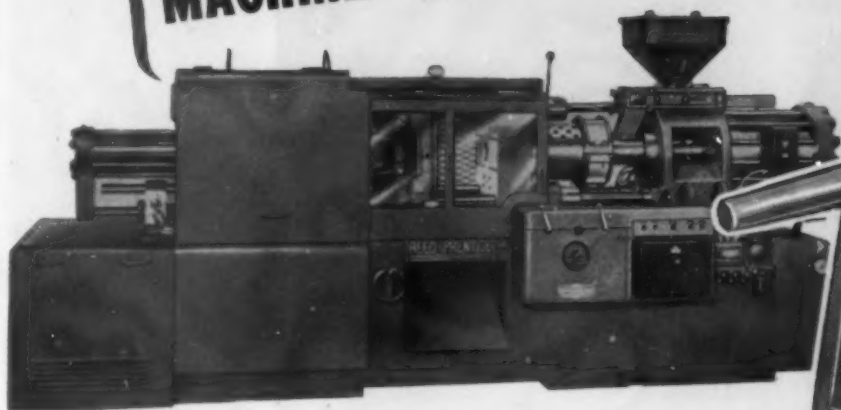
Odorless and tasteless

*Unsurpassed workability
with minimum waste*

CPT-9

THE *Right*

**METHOD=INJECTION MOLDING!
MACHINE=REED-PRENTICE!**



Ingenious design — a skilled molder and Reed-Prentice Injection Molding Machines combine to produce a plastic sales force for the Bright Star Battery Company.

This 9½ ounce battery display case is an excellent example of the molder's skill combined with perfect performance of the Reed-Prentice 10D-8 Oz. plastic injection machine. It is molded in a single piece from transparent polystyrene by A. J. Desimone Corporation of Paterson, N. J., who have an installation of 15 Reed-Prentice machines in their well equipped plant.

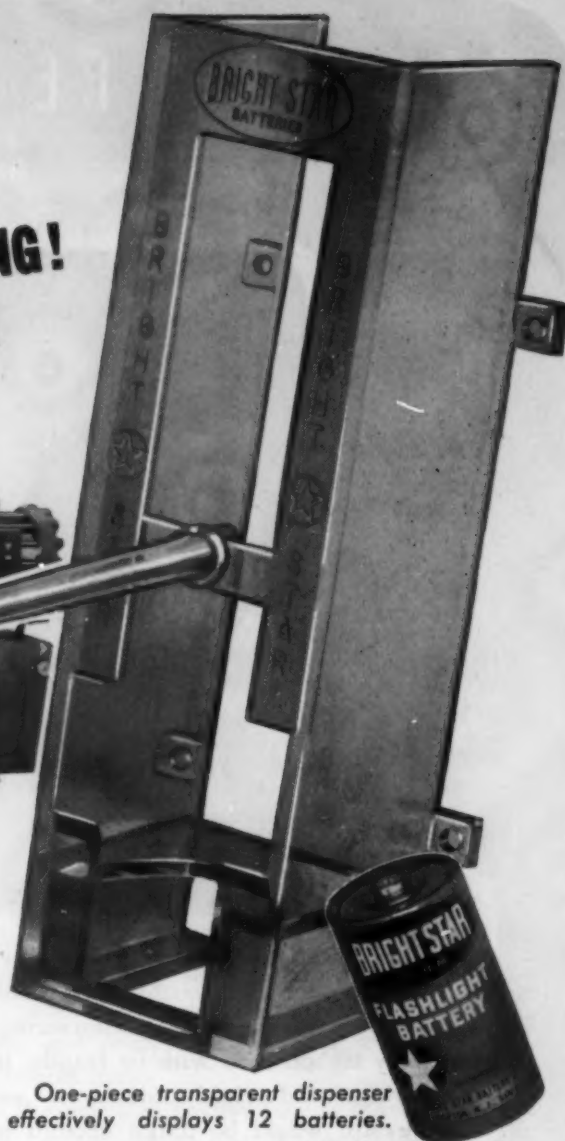
Complete control of the material plus accurate control of the machine, permits the molding of this extremely difficult, oversize, one-piece shot, without shrinkage or stress marks — a job that would ordinarily call for expensive fabrication.

Experienced molders *know* that Reed-Prentice

**THE WORLD'S LARGEST MANUFACTURERS
OF INJECTION MOLDING MACHINES**

NEW YORK
75 West Street

CLEVELAND
1213 West 3rd Street



One-piece transparent dispenser effectively displays 12 batteries.

injection machines are designed to exactly correlate the three most vital molding variables — time, temperature and pressure. It will pay you to investigate the advantages of using Reed-Prentice machines for *your* plastic products. Check and mail coupon NOW!

MAIL COUPON TODAY

Reed-Prentice Corp., Dept. D,
Worcester 4, Massachusetts.

Please send full information on Reed-Prentice Injection Molding Machine model(s) checked below:

4 Oz. ☐ 8 Oz. ☐ 10 Oz. ☐ 12 Oz. ☐ 16 Oz. ☐ 22 Oz. ☐

NAME

COMPANY

ADDRESS

LOS ANGELES
2328 S. Santa Fe Ave.

COULDN'T BE MOLDED, BUT . . .



The "But" is Transfer molding by Shaw, and the job that couldn't be done—was. This Walter Kidde Manufacturing Company siphon head with its fragile, intricate corings and rigid tolerances, and fine threads, would be tough enough to mold in several different pieces.

But — Shaw molded the head in one piece, threaded sections included, and with the inserts molded in!

Here is molding at its imaginative best.

Here is experience that takes a seemingly impossible-to-do assignment and converts it into a reality.

Not only was Shaw able to mold this difficult piece, but it was able to do so in a way that stepped up production.

These are engineering and production skills that you can use for your plastics molding problems. Shaw technicians are always available for consultation. Take advantage of this molding service now.



SHAW INSULATOR COMPANY

MOLDERS  SINCE 1892
160 COIT STREET IRVINGTON 11, N. J.

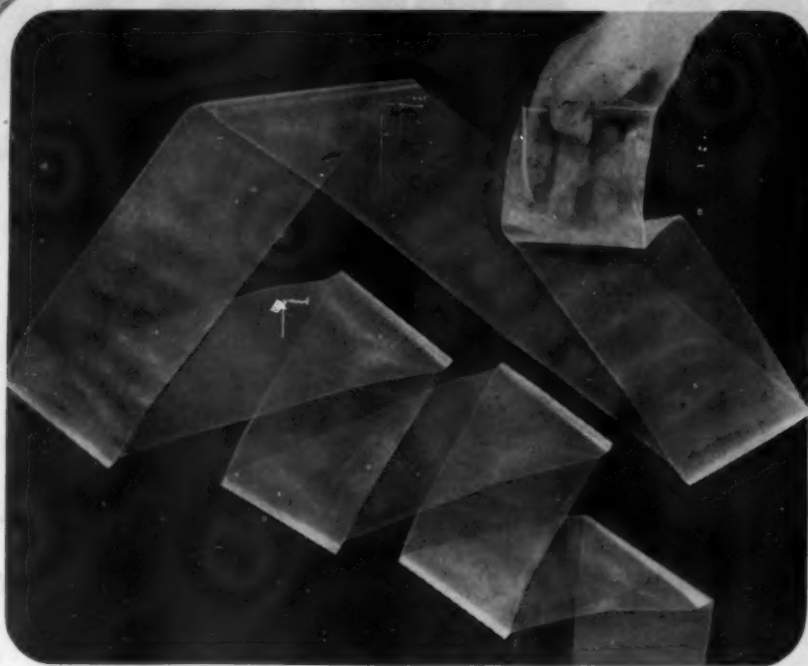
PLASTICS LITERATURE AVAILABLE

Shaw engineers have prepared a variety of literature, study of which might help you to a decision. Simply write a note about what phases of plastics especially interest you.

Or, you may prefer at once to call in a Shaw engineer, and present your problems for his study. This company's fifty-five years of plastics experience gives him a rich background from which you can draw.

Between the resources of Shaw and the Plax Corporation, Hartford 5, Conn., you can obtain assistance in almost all plastics methods and materials.

NOW POLYETHYLENE FILM IN TUBE FORM



Plax Polyethylene Layflat Tubing offers a real packaging scoop. Flexible and seamless, it makes available a polyethylene wrapper that needs to be sealed at only two places.

You simply slip the product into the tube, snip off the ends and seal — the package is finished.

Like the sheet, Plax Polyethylene Layflat Tubing may be cold-stretched several hundred per cent and wrapped tightly without

tearing. It has the same wax-like translucency, and is similarly non-toxic, tasteless, odorless, and resistant to fats and oils at room temperature.

Plax Polyethylene Layflat Tubing is available in many colors and in continuous lengths. Diameters range from 2½" to 27" in ½" graduations. Thicknesses range from .0015" to .010" in .0005" graduations. Write for samples and additional information to the Plax Corporation.

WRITE FOR THIS POLYSTYRENE DATA

How to Machine Plax Polystyrene Products.
How to Use Coolants with Plax Polystyrene Products.
How to Cement Plax Polystyrene Products.
How to Polish Plax Polystyrene Products.
Notes on Design and Assembly of Plax Polystyrene Products.
Die-cut Parts from Plax Polystyrene.
How to Form Plax Polystyrene Rod.

AND THIS PRODUCT INFORMATION

Data Sheets on Plax Cellulose Acetate, Cellulose Acetate Butyrate, Methacrylate, Polyethylene, Polystyrene and Ethyl Cellulose Products.
Article on Plax's Blown Products.
New special plastic shapes by Plax.



133 WALNUT STREET ★ HARTFORD 5, CONNECTICUT

more and more

WITCO STEARATES

to meet increasing demands

The unusual properties of the metallic salts of stearic acid result in the almost daily discovery of new uses.

To supply this increasing demand Witco has constructed in Chicago, and is now putting into operation, an additional plant which ultimately will double the capacity of its Brooklyn plant.

Shipments can now be made either from New York or Chicago.

Quality STEARATES for over a quarter of a century

ALUMINUM • BARIUM • CALCIUM • LEAD • LITHIUM • MAGNESIUM • SODIUM • ZINC

Samples on Request



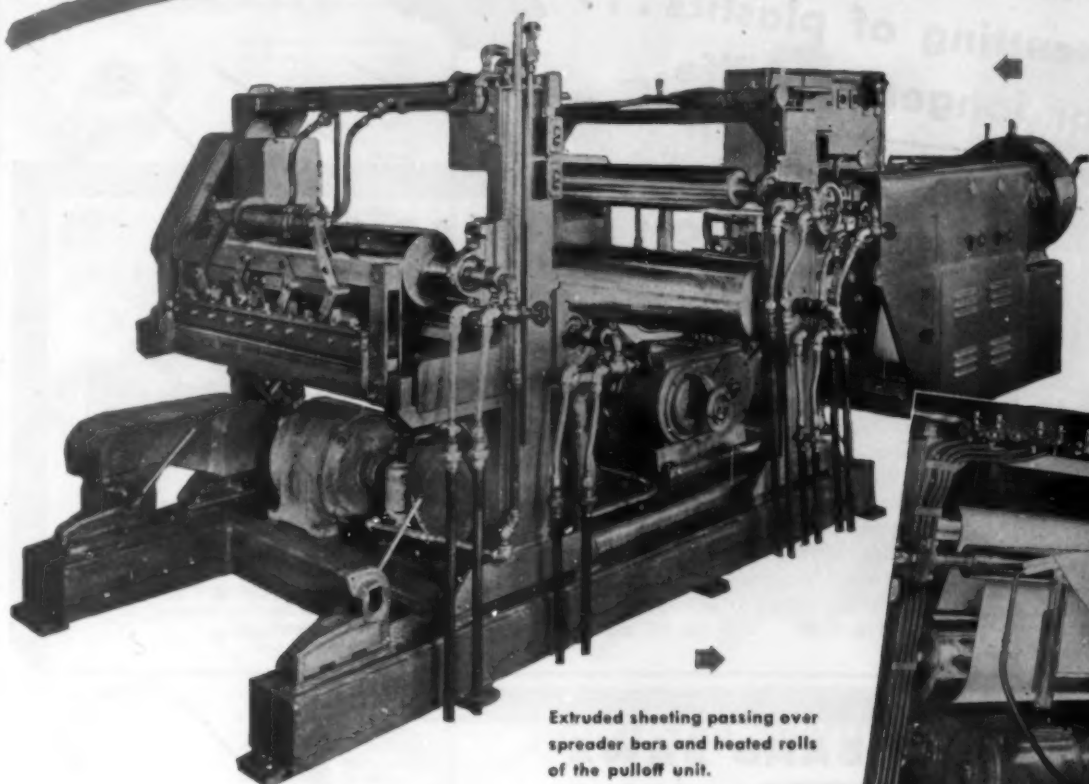
WITCO CHEMICAL COMPANY

MANUFACTURERS AND EXPORTERS

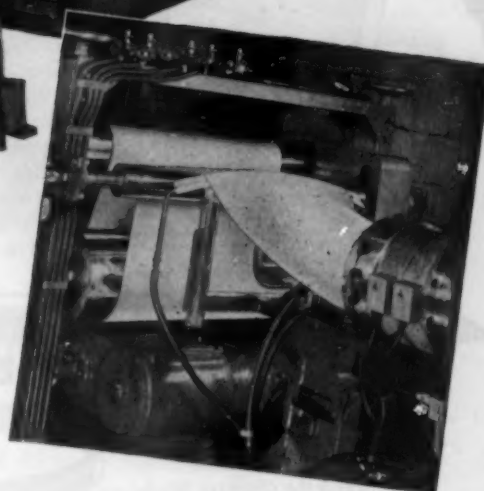
295 MADISON AVENUE • NEW YORK 17, NEW YORK

LOS ANGELES • BOSTON • CHICAGO • DETROIT • CLEVELAND • AKRON
SAN FRANCISCO • LONDON AND MANCHESTER, ENGLAND

NOW! direct extrusion of thin-gage sheet



Complete NRM Direct-Process Sheet-Forming Unit; including 3½" extruder, special sheeting head, with cooling and pulloff unit equipped with automatic cutoff and continuous windup. Finished product can be cut into sheets or wound on reels.



Extruded sheeting passing over spreader bars and heated rolls of the pulloff unit.

Costs slashed, new markets created by NRM Direct-Process Extruder and Pulloff Equipment

NOW, for the first time, an equipment manufacturer is able to offer the plastics industry a complete, full scale production unit for the direct extrusion of acetate and other types of thin-gage sheet.

Here's what that means:

1. Production costs are drastically cut ... as much as one half; unit will produce up to 150 lbs. of finished sheet per hour;
2. New markets, new products, and new uses for established products are made possible;

3. Thin-gage sheet output is greatly increased per dollar of capital investment, or:

4. Substantially less investment is needed for a given output of product;

5. Produces directly extruded material up to 22 inch trimmed width, 8 to 45-thousandths thickness. (Larger head for 36 inch wide sheet can be made available.)

The NRM Direct-Process sheeting unit is rugged, compact, requires a minimum of floor space. It consists of a 3½" NRM extruder

and special sheeting head, plus a cooling and pulloff unit with automatic cutoff and continuous windup for 36 inch untrimmed sheets. It is built by National Rubber Machinery Company, America's foremost designer and manufacturer of plastics extruders and extrusion equipment.

If you've been waiting for a practical, low-cost method of sheet production, here's your answer.

For full information, including photographs, specifications and floor layouts write us today.



NATIONAL RUBBER MACHINERY CO.

General Offices: AKRON 8, OHIO

Plastics
MACHINERY DIVISION

Export Distributors: OMNI PRODUCTS CORPORATION, 460 Fourth Avenue, New York 16, N. Y.

AUGUST • 1947

21

DISSTON CUTTING TOOLS

... for faster,
better cutting of plastics ...
and for longer tool life

DISSTON CIRCULAR SAWS

Disston makes a complete line of circular saws for the cutting of all types of plastics from thin wall tubing to highly abrasive laminated materials.

SOLID TOOTH

Disston Solid Tooth Circular Saws are supplied with set teeth, hollow ground or a combination of both ... in four different steels, tempered either for filing or grinding. Also supplied fitted with tungsten carbide tips. There is a wide variety of teeth patterns, each designed to meet definite plastics cutting needs. In all standard diameters and gauges ... and for all machines.



INSERTED TOOTH INSERTED SECTION

Disston Inserted Tooth or Inserted Section Circular Saws for plastics cutting are fitted with cemented tungsten carbide inserts, which are brazed on surfaces to keep them firmly in position. Shape of teeth and spacing are varied to suit operating conditions and material to be cut. These saws retain their cutting edges longer than other circular saws used for plastics cutting, hence require less frequent sharpening.



DISSTON BAND SAWS

The toughness and high flexibility of these saws enable them to withstand the constant bending and straightening even on small wheel, high speed machines. Supplied in two types for plastics cutting, each made of durable Disston Steel: (1) HARDENED THROUGHOUT



for cutting of hard and abrasive plastics, and for operating at speeds of 2000 to 4000 f.p.m.; and (2) HARD EDGE FLEXIBLE BACK for speeds of 800 to 1000 f.p.m. Two different sets: Straight and Raker. In all standard sizes.

DISSTON CARBOLLOY-FITTED SAWS, CUTTERS and SHAPER KNIVES

Recommended for use in shaping laminated phenol resinoid and other plastics with similar cutting characteristics. Supplied in a number of standard patterns, Disston Carboly-Form Cutters and Shaper Knives are made to your specifications. Fitted with Carboly to assure fast, clean cutting and long tool life. Bevels on edge of knives are accurately ground to provide a perfect fit in the collars. Also supplied in solid steel for high speed machines.

DISSTON BITE-RITE FILES for HAND USE ... for MACHINE USE

An exclusive product of Disston engineering that combines speed, long life and exceptionally smooth work. Teeth are clean, strong and sharp; cut at correct angles; uniform in width and depth; and staggered for straighter, faster, smoother cutting. Improved heat treatment gives Disston Bite-Rite Files an unusually long life. Supplied in all standard cuts, shapes and sizes ... for hand or machine use ... and for all materials.

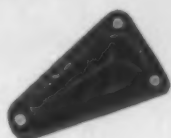


Order from your Disston Distributor or write direct for further particulars.

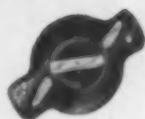
STEEL—Everybody who wants to obtain steel can help himself to get it by immediately starting scrap into the channels that serve steel mills.



HENRY DISSTON & SONS, INC., 834 Tacony, Philadelphia 35, Pa., U.S.A.



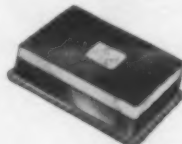
MECHANICAL strength can be added to molded parts without burdening weight. Fastening inserts, or structural reinforcements, are light, strong; available in many cases from stock.



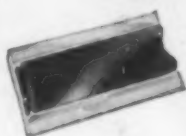
ELECTRICAL conductivity of aluminum is high. Perhaps you're thinking about a molded plastic electrical part where aluminum inserts provide the necessary conductivity. They're strong, too!



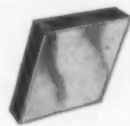
THERMAL properties of aluminum are excellent. Let's say you're designing a plastic product which must be air-cooled. You might use aluminum discs, molded in, as above.



DECORATIVE values of aluminum are a long story in themselves. Use it plain, or with frosty or mirrorlike Alumilite or colored finish (patented process). Remember, it's light!



EXTRUSIONS of plastic combined with extrusions of aluminum? Why not? One supplements the other, in beauty and strength. Alcoa Aluminum is available in many stock shapes.



LAMINATED plastics can be faced with aluminum sheet for a new idea in modern materials. Or, why not inset Alcoa Aluminum decorations in your dark laminates? Attractive!



FORMED plastic sheets team up well with Alcoa Aluminum, as in this navigator's dome. The whole assembly is light, strong, easy to mount. Is there a household idea here?



CHEMICAL properties of aluminum supplement those you like to stress in plastics. Can it help you in products for textile, process, petroleum, pharmaceutical, food industries?



TOO GOOD TO BE TRUE?



Not If You Specify Alcoa Aluminum!

Better Inserts? Yes, inserts of Alcoa Aluminum Alloys have an expansion coefficient comparable to that of common plastics. Therefore, stresses set up during cooling that may crack a costly job are eliminated.

Lower Prices? You pay less because Alcoa Aluminum yields three times as many inserts per pound of screw machine stock, compared with heavy metals. Your insert manufacturer can get Alcoa Aluminum Alloys in the stock sizes and shapes he requires for economical production. Talk to him about it.

For handsome appearance, light weight, chemical and electrical properties—wherever a metal is to be combined with a plastic—you'll find that *Aluminum-Plastic Teamwork Pays Off!* ALUMINUM COMPANY OF AMERICA, 2175 Gulf Building, Pittsburgh 19, Pennsylvania. Sales offices in principal cities

ALCOA FIRST IN ALUMINUM



IN EVERY COMMERCIAL FORM

INTRICATE MOLDING ON A HIGH PRODUCTION BASIS!



WHEN a tough nut must be cracked and a continuous high-velocity production quota maintained, our ability to produce quantity and quality stands as a prime factor in eliminating customer anxiety . . . building customer appreciation!

The moldings for the fuse boxes pictured above, presented just such a problem . . . high production of a difficult piece. These intricate plastic moldings are now being turned out on a high production basis at a low per unit cost.

When industry
demands the best
in compression molding . . .
Our specialists
produce the best
.. FASTER!

INSULATION MANUFACTURING CO.

Custom Molders of Plastics for Industry

11 New York Avenue

Brooklyn, N. Y.

A CAST PHENOLIC RESIN OF EXCEPTIONAL QUALITIES

MARBLETTE

Outstanding among plastics, Marblette has a jewel-like depth and a complete color range which duplicates the appearance of precious stones, tortoise shell and ivory.

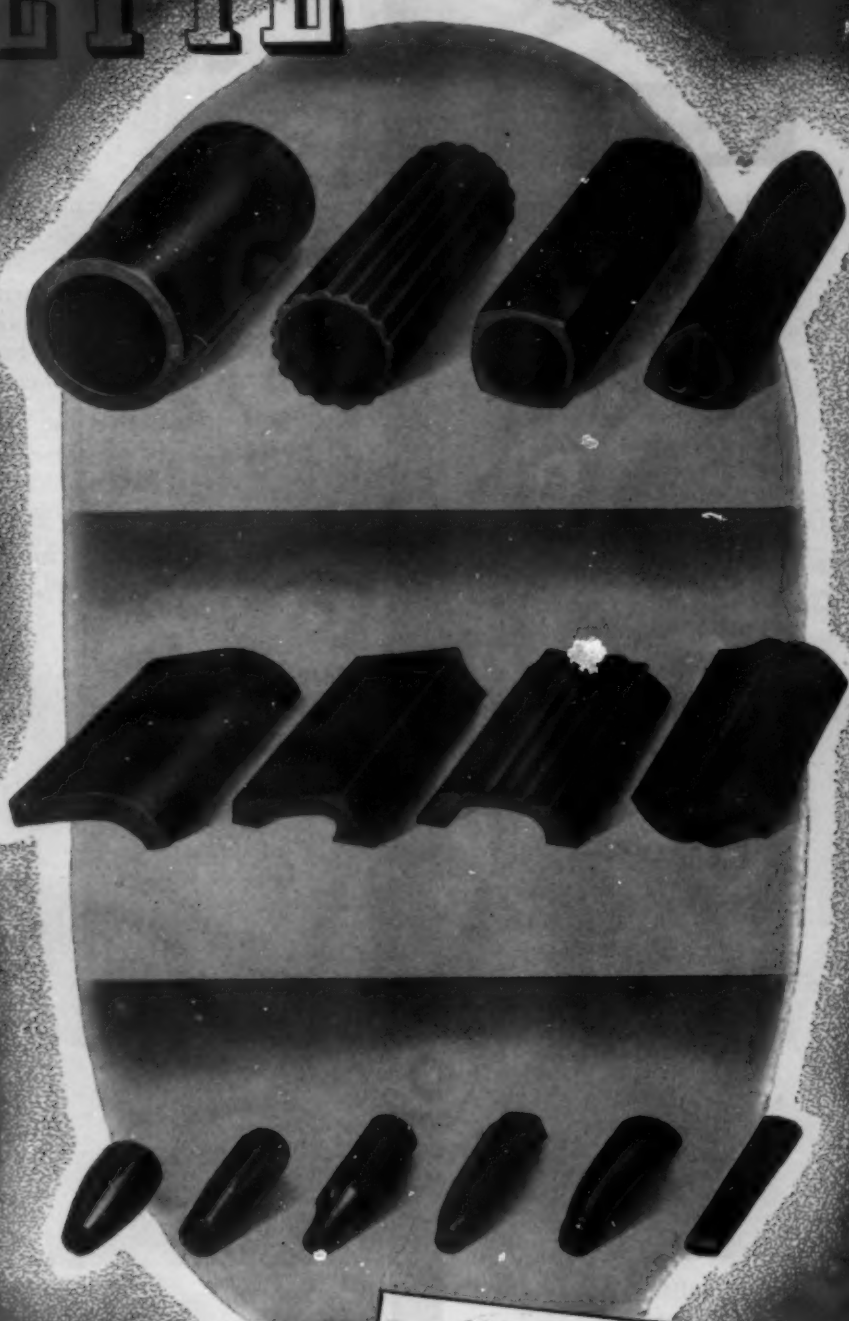
Its almost infinite variety of colors is available in transparent, translucent, opaque, or in mottled effects. Marblette also comes in a water clear form known as "Crystle" in a wide choice of colors.

Marblette's machining characteristics, resistance to oils and acids, non-inflammability and exciting beauty make it ideal for countless manufacturing needs.

MARBLETTE will help plan your world of tomorrow. The Marblette staff of engineers offers its services to help with your manufacturing problems. Write to us outlining your needs.

THE MARBLETTE CORPORATION

Manufacturers of Phenolic Resins Since 1929



SPECIAL CASTINGS

Marblette is supplied in sheets, rods, tubes, and special castings such as cutlery handles, kitchen utensil handles, pipe stems, cigarette holders, clock cases, automotive trimmings, jewelry items, buckles, etc. Special shapes made to customer's specifications can be supplied provided draft is all one way.

37-21 THIRTIETH ST., LONG ISLAND CITY 3, N. Y.

**PLASTICS DO RIGHT
BY IRONRITE**

On this outstandingly successful ironer with its proven ability to iron even such intricate items as shirts, plastics take a large share of the credit. The heat-resistant phenolic feedboard pre-warms and smoothes out the clothing as it is fed into the ironer. It is comfortable to the touch because, unlike metal, it has limited heat conduction. Kurz-Kasch engineers helped plan this feedboard, as well as the thermostat control housing, 11 years ago. Both moulds are still in use after repaying their costs many times.



Plastic pipe-dreams don't last 11 years!

Use plastics where plastics can definitely help your product, as on this phenolic feedboard for an electric ironer. We're still turning these out—just as sound, salesworthy, and efficient as on the day it was engineered 11 years ago. Here is an excellent example of the economies inherent in a good application of plastics coupled with a forward-looking design, back-stopped by superior mould-making for years and years of low cost service.

We maintain that the future of the plastics industry rests on applications such as these, and not on the Sunday-supplement or pipe-dream kind of application that helps neither user nor moulder—the kind developed by wartime shortages or over-enthusiasm.

If you're interested in planning advantageous use of plastics through the years ahead, Kurz-Kasch development engineers are at your service now.



Kurz-Kasch

FOR OVER 31 YEARS PLANNERS AND MOULDERS IN PLASTICS

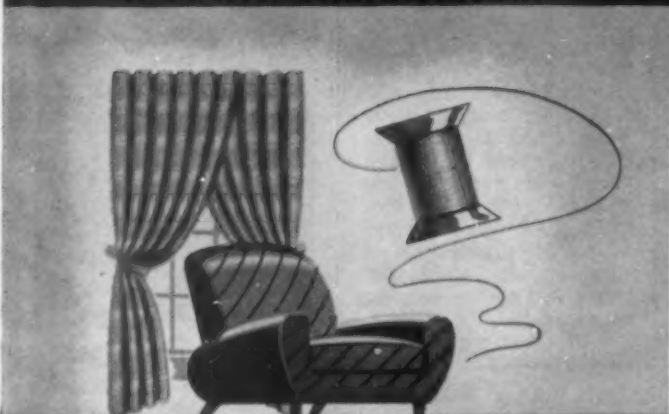
Kurz-Kasch, Inc. • 1415 South Broadway • Dayton 1, Ohio
Branch Sales Offices: New York • Chicago • Detroit • Los Angeles • Dallas
St. Louis • Toronto, Canada • Export Offices: 89 Broad Street, New York City



IT'S BETTER-THAN-LEATHER!



IT'S BEAUTIFUL FILM!



IT'S HANDSOME FABRIC!



IT'S DURABLE SCREENING!

any way you look at it, it's a sales-builder!

Firestone *Velon** the miracle material of modern merchandising

Whatever your product, however you use *Velon*, you'll have a matchless selling story for consumers that will bring many more your way.

Need leather for your product? *Velon* looks and feels like leather, but it wears better and costs less. Never cracks, peels or scuffs, and it washes clean. You have a choice of practically any grain.

Want an exceptional film? *Velon* never gets gummy with heat or moisture, never cracks with cold, never turns yellow with age or wear! Can be custom tailored to meet your needs.

Interested in a miracle fabric? *Velon* fibre

can be woven into new textures and patterns, in colors never before considered "practical." *Velon* fabrics defy dirt, staining, shrinkage, fading, wear and age.

How about a screen or mesh? *Velon* filaments make wonderful insect screens, or in closer weaves for radio grills, filters, ventilator covers. *Velon* strands never need paint, resist more impact, weigh less. Improve the appearance, add to the appeal, lengthen the life, lower the cost of your product with *Velon*. Write Firestone, Akron, for the *Velon* full-color booklet and information.

*TRADE MARK



AUBURN Plastics Reporter

Auburn Button Works, Auburn, N. Y.



MOLD MARK

Auburn Saves 50% in Mold Making Time By Use Of Hobbing Press



Perfect mold cavities are made in any desired quantity by forcing hob (master) into blank of hobbing steel by hydraulic pressure.

Up to 50% labor time in machining multiple mold cavities is saved by use of a 60-year-old device—the hobbing press.

The process consists of sinking a piece of hardened and highly polished steel, called a master or hob, into soft, cold steel or blank by use of a hydraulic press. The blank is domed and relieved, then ground and polished to a high finish before it comes into contact with the hob. When the hob is removed from the soft steel, the surface of the resulting cavity is found to be as smooth as the hob itself. By this method any number of mold cavities can be made with absolute uniformity in size and contour.

Although the operation sounds fairly simple, it takes years of experience to be able to produce uniform cavities consistently. The number of punches required is seldom less than two. Sometimes as many as five are needed. Blanks must be carefully annealed and highly polished after each punch. The use of specially designed punches is extremely important to the success of the operation as well as knowing how to preshape and core the blank.

There is also the problem of hobbing speed. Ordinarily it is slow, but in some cases it must be speeded up slightly to achieve deeper cavities. And unlike a machining operation where the

operator's progress is always visible, the success or failure of hobbing is not known until the hob is removed from the blank. When the hydraulic pressure is on and the hob is sinking into the blank, it is impossible to see what is happening. Here the skill of the operator is all-important. For if the work is done carelessly, or pressure applied too rapidly, the hob may be broken. Many hours of labor time can be lost in a few seconds in a hobbing press if the operator is inexperienced. At Auburn, operators are thoroughly trained and hobbing is so carefully supervised that accidents seldom occur.

Ordinarily only the female portion of the mold is hobbled. If the cavity is properly made, articles molded in it will be perfect replicas of the hob. The finish of the die is imparted by the hob and is more perfect than that secured by polishing a machined surface because of the blank metal flowing and condensing under the terrific pressure.

Each cavity as it comes from the hobbing press is heat treated after the outside has been machined and then hard chrome plated. It is then fitted in the frame of the die. A 360-cavity mold is the largest used at Auburn Button Works.

Use of equipment like the hobbing press is one reason why

Profitable Tips To Purchasing Agents

How many plastic parts did you mention in your inquiry? Most likely 10M, 25M, 50M, and 100M. If you are going to want 100M per order, it probably wouldn't pay to produce this quantity on tools designed for a quantity of 10M. Your best bet is to indicate annual quantities and estimated life of the part. This enables us, when estimating, to balance mold cost (per cavity) with piece price based on various capacities of molds, and wind up with the most economical mold investment for you.

Auburn Button Works is able to provide molds faster and at lower cost.

'Plastics Makes Perfect'



Kwik-Cup Coffee Maker
by Cafex

Lesson:

The cool handled base
Sets the table with grace.

Auburn Button Works is Eastern Licensee For Crystal Seal Process



Note the three-dimensional effect in this Recordak name plate molded by Auburn for Eastman Kodak.

Three dimensional eye-appeal, totally enclosed designs and multiple colors form the basis of the "Crystal Seal" molding process, patented by the Gits Molding Corp. of Chicago. Auburn Button Works is Eastern licensee for this new and excitingly different process. Installation of special equipment has just been completed and an extensive department set up at Plant 2.

A few of the almost unlimited applications for the process are: name plates, dials, trim, insignia, counter displays, trade marks, medallions, emblems, signs, escutcheons, plaques, buttons, ornaments, containers, stationery and desk products, game pieces, handles, knobs, drawer pulls and door plates.

A Crystal Seal product is a lustrous colored, three-dimensional object which has been integrally molded into a solid shape of transparent plastic (see cut). This effect is produced by a recessed molding in

the reverse side of the product, which takes the form of the letters or design being reproduced.

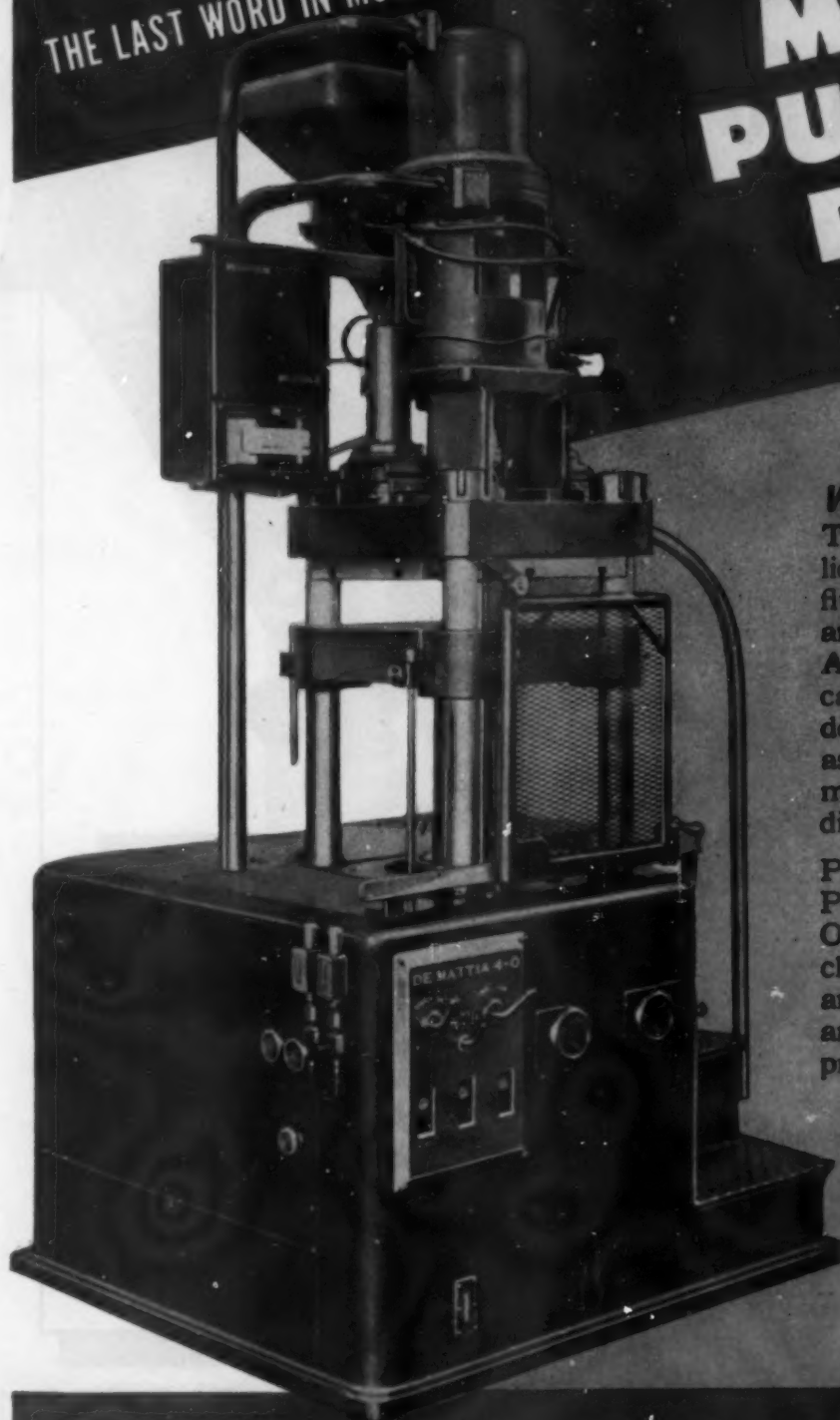
Upon completion of the molding operation, colors are sprayed on the reverse side. A masking process is used to register if a variety of colors is desired. By this operation, the various characters or designs are made to assume distinct and clear forms and appear to be independent of the body but imbedded therein. They have the appearance of being molded separately with a clear plastic covering, the contrast being quite pronounced. A second coating of color may be applied to the rear face to accentuate the contrast and to reflect light through the transparent body.

Since colors are bound integrally to the basic plastic form, no color deterioration due to dust, fumes or dirt can take place. Thus the life of Crystal Seal beauty and original color is practically indefinite.

**AVAILABLE
NOW!**

THE LAST WORD IN MOLDING... THE NEW

DE MATTIA MULTI- PURPOSE PRESS



WELL WORTH INVESTIGATING!

This new De Mattia all Hydraulic Vertical press features smooth fluid power both for injection and mold clamping operations. Available in both 4 oz. and 12 oz. capacities, this unit has been so designed that it can also be used as a compression and transfer molding press with a few additions at small extra cost.

PACING PROGRESS IN PLASTICS SINCE 1909—

Other De Mattia machines include horizontal models in 6, 12 and 24 oz. capacities. All types and sizes feature the latest improvements and are basically designed for lasting dependability. For complete specifications, and information on molding presses, scrap grinders and mold making facilities, please write on company letterhead.

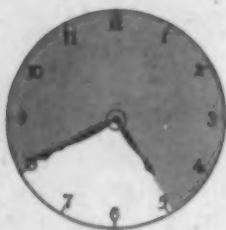
DE MATTIA MACHINE and TOOL CO.

CLIFTON, NEW JERSEY — N. Y. Sales Office: 53 Canal St. — Cable Address: Bromack, N. Y.

DE MATTIA
MACHINE and TOOL CO.

STURTEVANT Air Separators

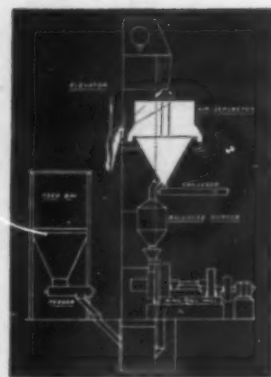
**Increase Output up to 300%
Per Worker's Shift**



Saving time by increasing production results in greater earnings. Sturtevant Air Separators effect worthwhile savings by increasing mill capacities from 25 to 300% . . . cutting power consumption by as much as 50%. They efficiently carry off all classified materials in any desired fineness from 40 to 325 mesh and finer. In addition, their rugged construction reduces maintenance. Look into the tonnage producing, cost reducing Sturtevant Air Separators, today. They are available in capacities from $\frac{1}{4}$ to 50 tons per hour.



Sturtevant Air Separator in "closed circuit" with pulverizer. This combination increases tonnage and reduces costs in all types of industry.



STURTEVANT MILL CO.

110 CLAYTON STREET
BOSTON 22, MASS.

Designers and Manufacturers of CRUSHERS • GRINDERS • SEPARATORS • CONVEYORS • ELEVATORS • MECHANICAL DENS AND EXCAVATORS • MIXERS

**MACOID will help you
PLAN it in PLASTIC**



In the plans you will be drawing tomorrow,
there's a place, perhaps, for Plastics.

For extrusions or injection moldings—MACOID engineering and manufacturing talent
will work smoothly with you and for you, making plans into realities.

DETROIT MACOID CORPORATION

Originators of Dry Process Plastics Extrusion

12340 CLOVERDALE • DETROIT 4, MICHIGAN

EXTRUSION AND INJECTION MOLDING



competence misses the hazards

GMP

GMP
MOLDERS OF PLASTICS

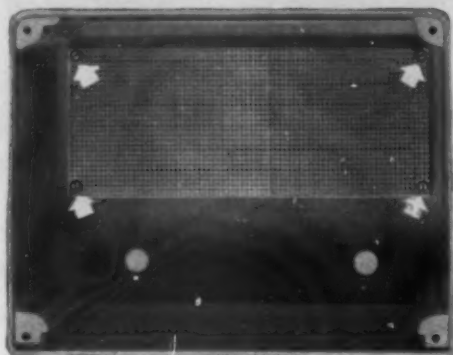
Molders of Plastics



GENERAL MOLDED PRODUCTS • INC

OFFICE AND PLANT • DES PLAINES • ILLINOIS • Suburb of Chicago

COMMON SENSE ASSEMBLY ENGINEERING



The metal grill is fastened to the plastic cabinet with four P-K Type "F" Self-tapping Screws. The cabinet is molded of urea formaldehyde, and the chassis of an impact material. The P-K Type "F" Self-tapping Screws cut strong threads as they are driven,—can be removed and reinserted.

Four P-K Type "F" Self-tapping Screws fasten the back panel to the cabinet.



● Fastening of the grill, light and tube sockets, and back panel in this portable REFRESH AIRE Ozonizer for homes and offices could have been a slow, wasteful, expensive operation.

But the manufacturer, REFRESH AIRE Corp. of New York City, wisely questioned fastenings and, after exhaustive tests, chose P-K Self-tapping Screws. "The P-K 'short-cut' method proved superior to all other methods tried", reports the manufacturer, "saving from 50% to 70%."

Molding of the plastic cabinet and chassis (by the Boonton Molding Co., Boonton, N. J.) was simplified, since inserts were avoided. Tapping was eliminated, because P-K Screws form threads as they are driven in molded or drilled holes.

It's plain common sense for you to take advantage

Saves 50% to 70%
over all comparative fastening methods



The light and tube sockets are fastened to the chassis with 3 P-K Type "F" Self-tapping Screws.

of this "short cut" to lower assembly costs wherever possible. In 7 out of 10 assemblies submitted to us, plastic or metal, the use of P-K Self-tapping Screws resulted in substantial savings—often 50% or more.

Let a P-K Assembly Engineer check your fastening operations, or mail assembly details for recommendations. Parker-Kalon Corporation, 200 Varick Street, New York 14.

Sold Only Through Accredited Distributors



TYPE "A"



TYPE "Z"

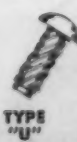


HEX HEAD
TYPE "Z"

P-K



TYPE "F"



TYPE "U"



TYPE "T-Z"

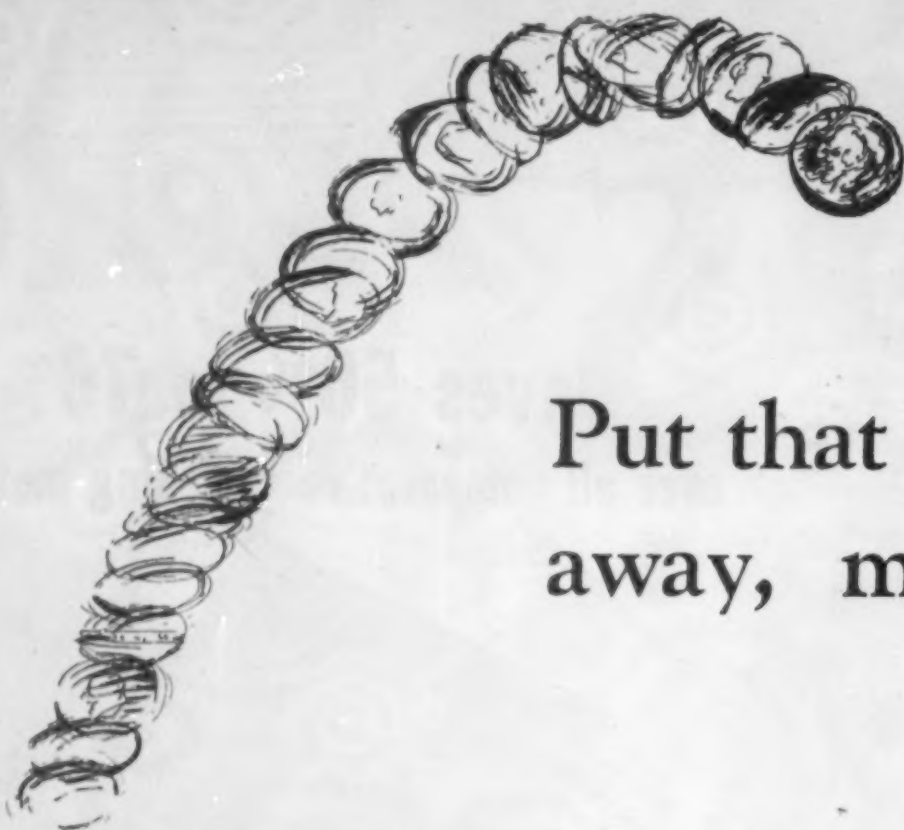


TYPE "Z"
PHILLIPS

PARKER-KALON

SELF-TAPPING SCREWS

A FASTENING FOR EVERY METAL AND PLASTIC ASSEMBLY



Put that coin away, mister

You can't select a good plastic moulder that way—any more than you can make other important decisions by a flip of a coin. Leave us face it—the most important features your supplier should possess—to serve you properly—are 1. Experience, 2. Equipment, and 3. Trained personnel. These assets are the components of the service you get at WATERTOWN.

For 35 years Watertown has been serving industry with a plastics technical skill equalled by few.

New York Cleveland Chicago
Milwaukee , Detroit

**THE WATERTOWN MANUFACTURING
COMPANY**

1000 Echo Lake Road
WATERTOWN, CONNECTICUT



FOR EYE-APPEAL IN BETTER BRUSHES

Wynene

BRISTLES



There's a new eye-delighting feature in Wynene bristled brushes. It's color . . . glowing, sparkling, vivid rainbow hues that are doing wonders for brush saleability. Wynene bristles retain their flexibility in a caressing pliability so desirable in personal brushes right thru to a stiffness that's essential in brushes for industrial purposes. They won't rot or crush. Acids and chemicals won't affect them. They're designed for easy workability and long life -- in nine thrilling colors plus a pure porcelain white and a glistening jet black. Would you like to see samples of these colorful Wynene bristles? We'll welcome an opportunity to show them to you.

TRADE MARK REG. U.S. PAT. OFF.

The **NATIONAL** *Plastic Products Company*
ODENTON • MARYLAND

© 1947 T. N. P. CO.

NEW YORK: EMPIRE STATE BUILDING • LOS ANGELES: BANKERS BUILDING

Sub-Zero Plastics tests at JOHNS HOPKINS University Research Laboratories *with* OLSEN PLASTIVERSAL

The Laminated Plastics Test Project operated at Johns Hopkins University, in Baltimore, Maryland, has conducted over 5000 tension, compression, and flexure tests at temperatures ranging from -100° F. to $+200^{\circ}$ F. with the Olsen Plastiversal Testing Machine illustrated here.

This project, sponsored by National Electrical Manufacturers Association, is under the direction of Dr. Ralph K. Witt, who devised the special low temperature testing techniques shown.

The Olsen Plastiversal Testing Machine is equipped with an Olsen Electronic High Magnification Recorder which produces, in chart form, an accurate stress-strain diagram of each test made. The specimen is placed in the tension, compression, or flexure clamps, with extensometer attached — all in the temperature controlled cabinet. The machine is put in operation and every step in the physical change of the specimen during the test is transmitted electronically to and recorded on a letter size chart for permanent record and subsequent study.

The high accuracy, ease of operation, and dependability of this equipment is an invaluable aid in the comparison, standardization, control, and development of plastic materials.

The Olsen Plastiversal has been designed especially to meet the needs of the Plastics Industry — it is but one of a number of perfected testing instruments for both laboratory and production use. We will be pleased to send complete details on Olsen Plastics Testing Equipment — Write today for Bulletin No. 23.

OLSEN

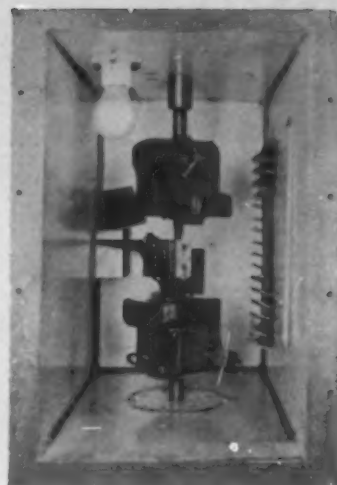
Testing & Balancing Machines

TINIUS OLSEN TESTING MACHINE CO.

880 North Twelfth Street, Philadelphia 22, Pa.

Representatives:

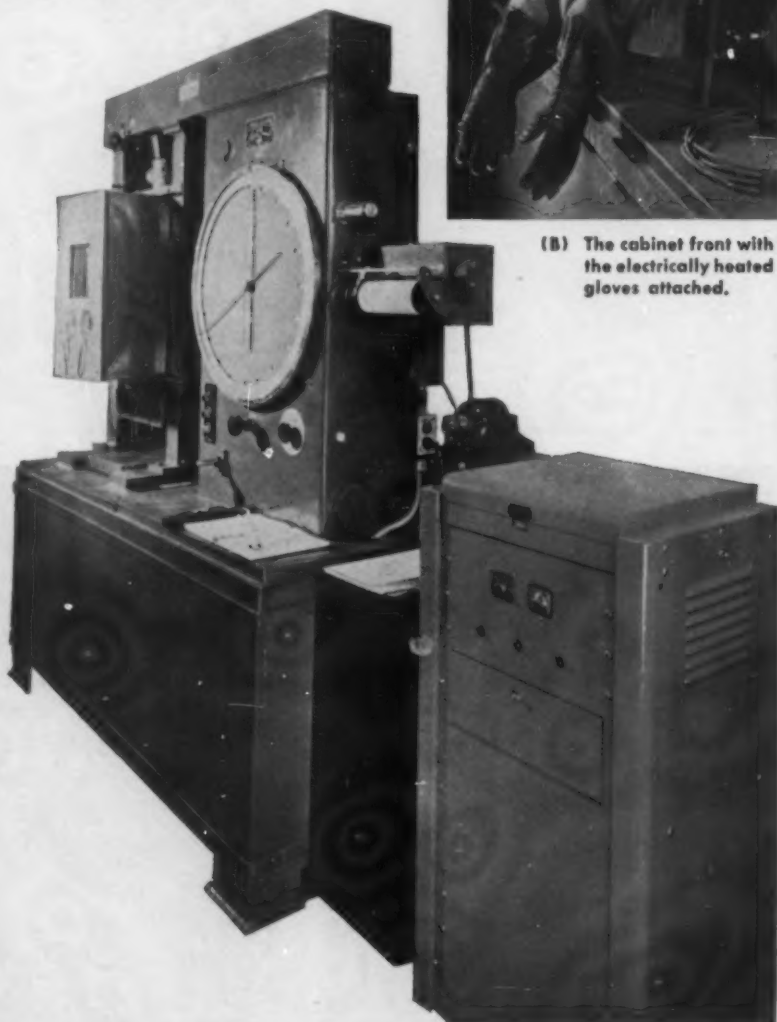
Pacific Scientific Co., Los Angeles, San Francisco,
Seattle • Mine Smelter Supply Co., Denver, Colo.



(A) Interior of low temperature cabinet showing sample racks and tension grips with extensometer attached.



(B) The cabinet front with the electrically heated gloves attached.

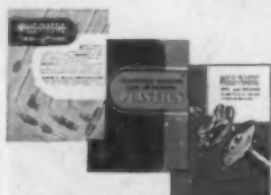


Molded for feminine daintiness

The molding of this Dr. Weeks Hygienic Spray was the kind of assignment our engineers relish. Here was a production job that presented interesting problems in every phase from blue-print to assembling room. The intimate nature of the product demanded extreme care in the choice of plastic material. We had to develop a new molding technique to meet the precision-fine tolerances and unique construction of the spray. However, we enjoyed the work because it is these difficult, unusual and even so-called "impossible" jobs that really increase our ability to serve you.

We invite you to profit by our experience. Bring your plastics products to us for molding craftsmanship that will satisfy your most exacting demands of quality.

Dr. Weeks Hygienic Spray,
Molded For Walkner
Distributors, Dallas, Texas



Write on your letterhead for the new Injection Molded and Extruded Plastics catalogue. Or, for detailed information about **COLO-PLASTIC**® pipe, tubing and fittings, write for circulars containing data and illustrations.

®Trademark Reg.

ELMER E. MILLS CORPORATION

INJECTION MOLDERS and EXTRUDERS of: Tenite, Lumarith, Plasta-cel, Fibestos, Lucite, Plexiglas, Nylon, Polystyrene, Styron, Lustron, Loalin, Vinylite, Geon, Plexene, Polyethylene, Cerex, Forticel, **COLO-PLASTIC**®, Saran, and other Thermoplastic Materials.

153 WEST HURON STREET • CHICAGO 10, ILLINOIS

CABOT

SUPERCARBOVAR

MONARCH 81

MONARCH 71

Cabot carbon blacks for
black plastics

Complete laboratory studies in collaboration with manufacturers have developed Cabot carbon blacks for plastics.

Cabot Supercarbovar, Monarch 81 and Monarch 71 disperse easily. Their low surface area prevents embrittlement, and exposure life is prolonged because ultra-violet rays are filtered out.

Yet with all these properties, Cabot Supercarbovar and the Monarchs are used at considerable economy in black plastics compounds, because the price is low.

CABOT

GODFREY L. CABOT, INC.

77 FRANKLIN ST., BOSTON 10, MA

first to develop a corrugated PREPAK*



* REG. U. S. PAT. OFF.

Hinde & Dauch cooperated with one of the country's leading department stores in developing the original PREPAK*, a method used to factory pack products in selling units for delivery direct to consumer without repacking by the retailer. This more efficient, more economical packaging method saves damage in transit, eliminates mark-downs. PREPAK*... an attractive package that invites more sales and "take-withs"... enables the retailer to sell from display and ship from warehouse. Each H & D "first"... the DUPLEX shipping-display box, the duo-use LUGGAGE BOX and many others... provides better protection, more advantages in shipping, greater economy in distribution. The Hinde & Dauch Paper Company, 4709 Decatur Street, Sandusky, Ohio.

LOOK TO

REG. U. S. PAT. OFF.



FOR PACKAGING

"firsts"

HINDE & DAUCH · *Authority on Packaging*

FACTORIES IN: Baltimore 13, Maryland • Buffalo 6, N. Y. • Chicago 32, Illinois • Cleveland 2, Ohio • Detroit 27, Michigan • Gloucester, N. J. • Hoboken, N. J. • Kansas City 19, Kansas • Lenoir, N. C. • Montreal, Quebec • Richmond 12, Virginia • St. Louis 15, Missouri • Sandusky, Ohio • Toronto, Ontario • Boston, Mass.

AUGUST • 1947

39

Complete Service
at **"YOUR PLASTICS
DEPARTMENT"**

INJECTION MOLDING
★ **MINCOR** ★
"YOUR PLASTICS DEPARTMENT"

DESIGNING

ENGINEERING

TOOL MAKING

MOLDING

DRILLING

TAPPING

PRINTING

PAINTING

ASSEMBLING

PACKAGING

**MINNESOTA PLASTICS
CORPORATION**

366 WACOUTA ST.

ST. PAUL 1, MINN.

PHONE CE. 0959



● This lovely plastic for luggage, handbags and upholstery is just one example for you of *Resproid's* versatility. Manufactured in a wide variety of lovely styles—unsupported plastic films, wear-resistant plastic coated fabrics and extruded shapes—this modern vinyl plastic is just as pretty, practical and profitable in shower curtains, aprons, waterproof garments, belts—a range of products as limitless as your own imagination.

Resproid comes in a rainbow of jewel-like colors and pastel shades—colors that are practical anywhere because *Resproid* can be cleaned in seconds with just a damp cloth. And *Resproid* is almost indestructible in everyday use—resistant to crack-

ing, fading, scuffing and abrasion—to perspiration, acids, alkalies and oils.

Whether you're looking for new products to make or new ways to improve your present line, *Resproid* offers you a whale of an opportunity. Investigate *Resproid's* profit possibilities now.

• Manufactured in a modern, fully equipped plant under strict laboratory control, *Resproid* is compounded of high molecular weight resins which can be processed only on the latest plastic equipment and which give greatly increased wearing qualities. Insist on the name *Resproid* whenever you buy plastics.

Respro INC.
CRANSTON 10, RHODE ISLAND

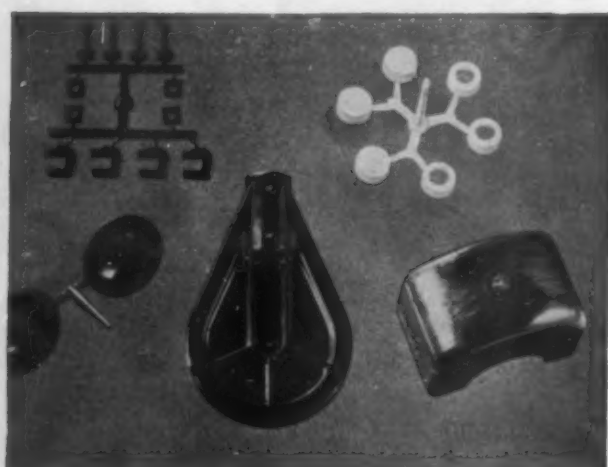


Plastic Parts OF EVERY DESCRIPTION



**INJECTION MOULDING
EXTRUSION MOULDING
PLASTIC FABRICATION
ENGINEERING COUNSEL**

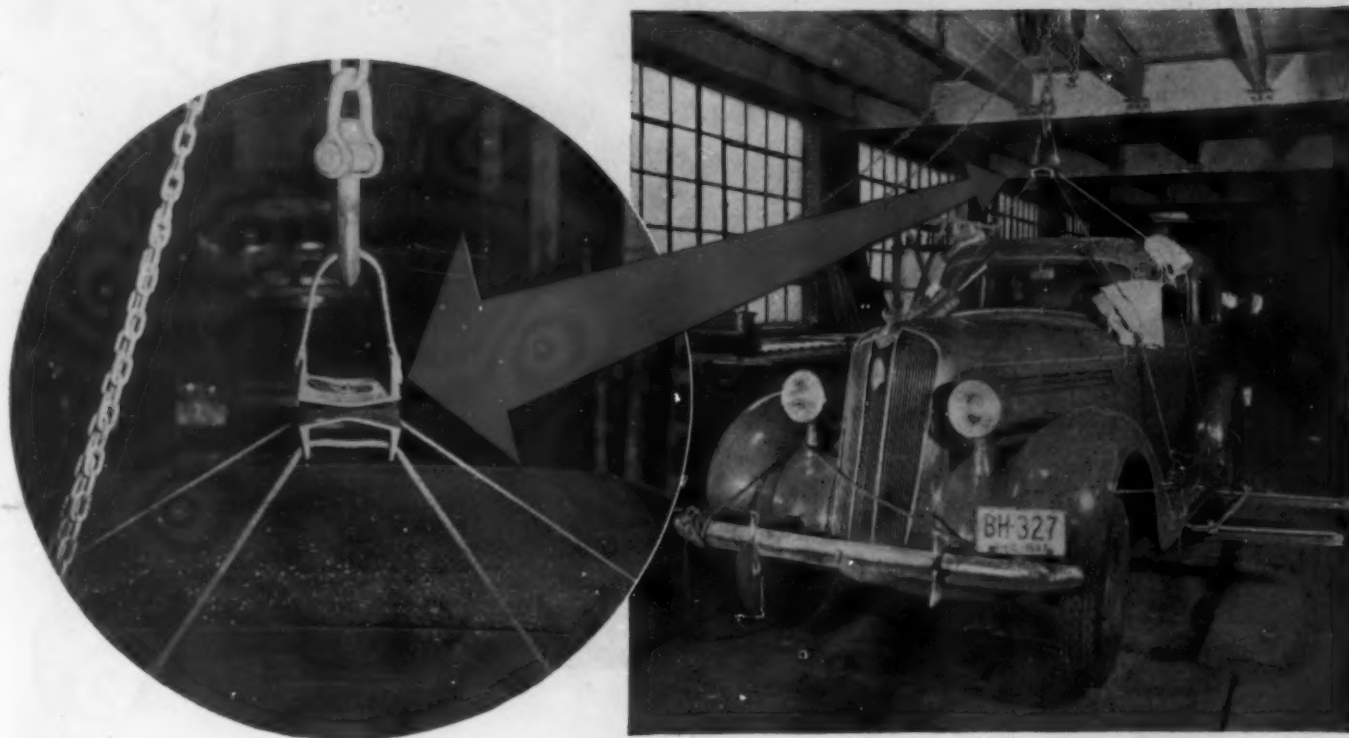
**Complete Mould
and Tool Shop**



ST. LOUIS PLASTIC MOULDING CO.

SAINT LOUIS 8, MISSOURI

Speed Nuts^{*} are stronger than you might think



● Here's convincing proof of SPEED NUT holding power! A single fender type SPEED NUT weighing less than half-an-ounce, and used with a 5/16—10 Acme bolt, held together the two brackets suspending this 3,325-pound car.

● These photos were taken ten years ago, during the test that proved to automotive engineers that SPEED NUTS had what it takes for automotive assembly. Since that

time, hundreds of millions of SPEED NUT brand fasteners have been used by car and truck manufacturers to speed up production and drastically reduce assembly costs.

● Other industries, too, are enthusiastic about the SPEED NUT System of Assembly. Hadn't you better check these streamlined fasteners now, to improve the assembly of your product? A letter will bring full details.

TINNERMAN PRODUCTS, INC., 2048 Fulton Road, Cleveland 13, Ohio

In Canada: Wallace Barnes Co., Ltd., Hamilton, Ontario
In England: Simmonds Aerocessories, Ltd., London

In France: Aerocessories Simmonds, S. A., Paris
In Australia: Aerocessories, Pty. Ltd., Melbourne

Speed
MORE THAN 4000



Nuts^{*}
PATENTED
SHAPES AND SIZES

Trade Mark Reg. U. S. Pat. Off.

F A S T E S T T H I N G I N F A S T E N I N G S

AUGUST • 1947

43

Here's another interesting use for American Anode latices and mixes

Do these toys suggest any new—and profitable—products that you might make from latex?

THESE rubber toys are just one of the scores of new and interesting things that have been done recently with American Anode latices and mixes.

And they're only an indication of the many added things that *will* be done with these materials in the future.

Do you have an idea for a new product—or an improvement of an old one? If so, don't assume it can't be done with latex until you've consulted with American Anode development men.

Rubber toys—industrial adhesives; surgical catheters—paper impregnants; meteorological balloons—metal coatings. These few uses show the broad range of possibilities for American Anode latices and mixes.

Latices and compounded mixes of GEON, HYCAR, Saran, neoprene, crude rubber and GR-S are available. For more information about these modern materials—and proper methods of using them, please write Department AF-4, American Anode Inc., 60 Cherry St., Akron, Ohio.

AMERICAN ANODE INCORPORATED

Crude and American Rubber Latices, Water Cements and Suspensions



Toys manufactured by Rompol Mfg. Co., Inc.

Better Dies Mean Better Molded Parts

that's why
ERIE RESISTOR
has its own
Die Department



A correctly designed and constructed die is one of the most important factors in producing outstanding custom molded plastic parts.

At Erie Resistor, all new dies are laid out and designed by our own engineering department. We have our own die shop, staffed to a large extent by the same tool makers who have serviced plastic dies at Erie Resistor since we first pioneered the field of custom injection molded plastics in 1935. These men work under the direction of a superintendent

who has had 40 years' experience in die-making, much of which has been spent on plastic molds. As shown in the illustrations, the die shop has all the necessary equipment of latest design for producing molds exactly to print.

With these facilities, you are assured that when you place your order for custom injection molded parts with Erie Resistor, accurate and correctly designed dies will facilitate the production of finished pieces that meet your specifications and your expectations.



Plastics Division

ERIE RESISTOR CORP., ERIE, PA.

LONDON, ENGLAND TORONTO, CANADA



Celluplastic

has the engineering experience and plant facilities to satisfy your most exacting requirements in **Extrusion and Injection Molding**

We have been specialists in plastics since 1919. . . We operate one of the world's finest plastics plants . . . We serve literally *thousands* of customers, many of them *top names* in American industry.

Here is what we can do for you in—

EXTRUSION MOLDING—We work in *every* thermoplastic material. We have the equipment to handle a vast variety and volume of special and standard shapes—flexible and rigid. We produce:

Rods	Strips	Monofilaments
Tubes	Ribbons	Yarns
Belting	Sheets	Furniture Webbing

—and many other extruded products—in all colors, in continuous lengths.

INJECTION MOLDING—We handle everything from small fittings to large cabinet surfaces. We have machine capacity up to 22 ounce shots.

Contact Celluplastic today. Simply give us your *idea*. We'll take it up from there. We'll design your product, engineer it, produce it, assemble and ship it—whether it calls for a short or long production run.



Also
America's #1
Source for Plastic
Containers

Celluplastic Corporation

50 AVENUE L, NEWARK 5, N. J.

PLASTIC
CONTAINERS
and
PLASTIC
PRODUCTS

New York Office: Rockefeller Center, 630 Fifth Ave., Circle 6-2425 • West Coast: Container Service Co., Los Angeles 27, Cal.



...THE HAND OF EXPERIENCE holds the answers

The Hand of Experience has at the tip of its fingers conventional designs and intimate knowledge that it adapts and combines to produce specialized products.

This means great savings in experimentation and expense.

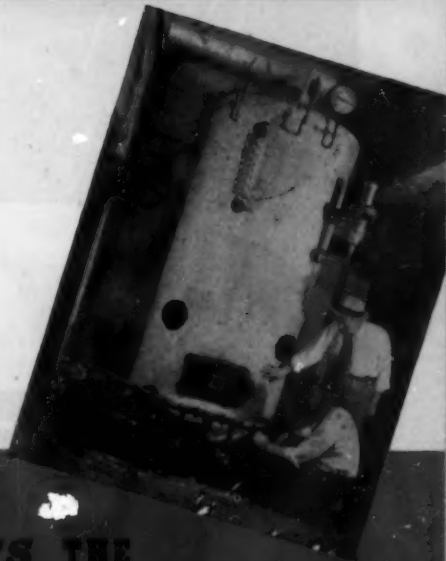
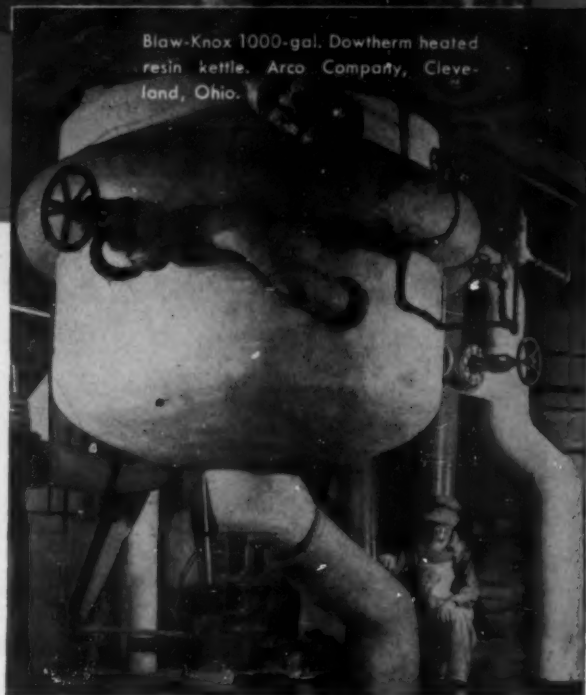
In this massive 1000-gallon Dowtherm heated resin kettle—built for the Arco Company, Cleveland, Ohio—Blaw-Knox has adapted and combined conventional designs to produce modified resins of a special nature. The process requires high temperatures, high pressure, and heavy construction throughout.

The Blaw-Knox Hand of Experience makes savings for others—awaits your call to serve you.

BLAW-KNOX DIVISION OF BLAW-KNOX COMPANY

2116 Farmers Bank Bldg.

Pittsburgh 22, Pa.



BLAW-KNOX IMPLEMENTS THE PROCESS INDUSTRIES



FOR GREATER STRENGTH... **CO-RO-LITE** ROPE FIBRE PLASTIC

A ready-to-mold, high-impact industrial plastic compound, reinforced by long, tough rope fibres that form an interlocking system of remarkable qualities. Readily preformed and molded into compound curves — deep draws — angles — channels and large shells.

CO-RO-LITE is equally effective with fluid pressure, flash or transfer molds. The long, tough interlocking rope fibres reinforce all sections of the molded unit, imparting great impact, flexural, compressive and tensile strength in a range of densities comparable to wood.

Illustrated: Hobby Horse by Burke Rubber Company, Plastics Division
Chair by Gemco Furniture Corp.
Baby Stroller by Hedstrom-Union Co.



CO-RO-LITE Gives You...

1. Continuous reinforcement of long, interlocked fibres.
2. Greater impact strength.
3. Handy preforms for molding.
4. Readily adaptable to compound curvatures.
5. Wide range of molding densities.
6. Combined rigidity and flexibility in the same piece.
7. Usable in compression, fluid pressure and transfer molds.

Product and process patented.
Other patents pending.

**ALLIED
PRODUCTS
DIVISION**

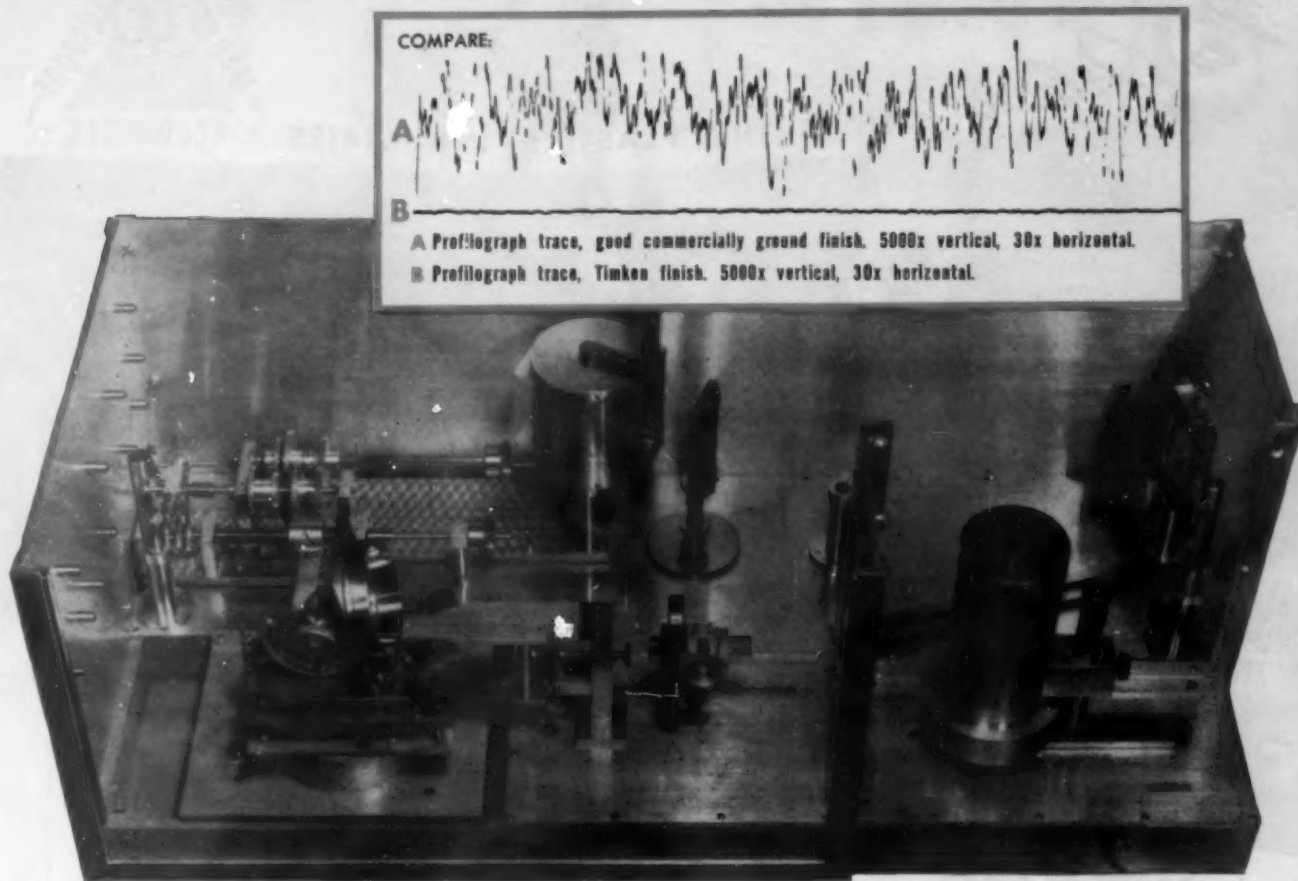
COLUMBIAN ROPE COMPANY

460-92 Genesee St., Auburn, "The Cordage City," N. Y.

Canadian Licensee: Canadian Bridge Engineering Company, Ltd.,

Box 157, Walkerville, Ontario, Canada.

Timken bearings can make your product better . . . here's one of the reasons why:



Answers the question— "How rough is smooth?"

ONE of the reasons Timken tapered roller bearings perform with such frictionless, wear-free ease is the amazingly smooth surface finish on the rolls and races—the finest known to modern bearing science.

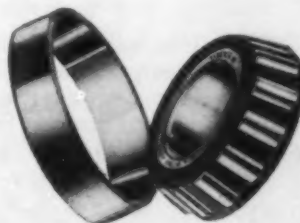
Now, when you talk about finishes like this, you're talking about surface irregularities of only a few millionths of an inch—irregularities which are impossible to detect by any ordinary means. So, when Timken first began to develop this finish, one of the biggest obstacles was the absence of an accurate method of measuring the roughness of an apparently smooth surface.

The profilograph pictured above was the answer. Developed by Tim-

ken in 1928 and steadily improved since then, the profilograph determines surface irregularities to within one-millionth of an inch. Equipped with this measuring stick, Timken engineers were able to develop new finishing methods and machines, which have resulted in the microscopic surface accuracy of the Timken bearings you use today.

Every factor in the efficiency of a bearing is approached at Timken

in this same scientific manner. For example, Timken makes its own steel to assure constant quality. And Timken is the acknowledged leader in: 1. advanced design; 2. precision manufacture; 3. rigid quality control; 4. special analysis steels. No wonder you can always be sure of uniformly top quality and performance in the Timken bearings you use. The Timken Roller Bearing Company, Canton 6, Ohio.



TIMKEN
TRADE-MARK REG. U. S. PAT. OFF.
**TAPERED
ROLLER BEARINGS**

NOT JUST A BALL ○ NOT JUST A ROLLER □ THE TIMKEN TAPERED ROLLER □ BEARING TAKES RADIAL ○ AND THRUST — □ — LOADS OR ANY COMBINATION

AUGUST • 1947

49

New Orleans OFFERS THE PLASTICS INDUSTRIES



anyway you look at it . . .
MARKETS!

MARKETS . . . domestic, the vast Mississippi Valley and the 10 progressive southern states -- foreign, 150,000,000 buy-minded people in Central and South America, Mexico, the Caribbean; rich markets—eager for plastics and able to pay. Half of Latin America neither manufactures plastic materials nor fabricates semi-finished forms of plastics, keenly needs our exports.

RAW MATERIALS . . . near New Orleans are a wealth of natural resources, including abundant quantities of cotton, wood pulp, soda ash, sulphur, bagasse and petroleum derivatives, cellulose, resins, carbon black and various acids. Many materials needed in plastics manufacture (for example, casein and castor beans) are imported through the Port of New Orleans and readily available here.

TRANSPORTATION . . . efficiently coordinated facilities: modern, sheltered harbor, 97 ship and barge lines, 8 major air lines, 9 trunk line railroads, well-kept highways, connected with the 13,000 mile network of inland waterways. *Low Cost Fuel*, unlimited natural gas, abundant, economical electricity; *Skilled Labor*, plentiful, intelligent, cooperative, more than double the supply in 1940; *Friendly Taxation*, local and state, encourages industrial growth.

TRADE FACILITIES . . . unequalled. New Orleans International House, International Trade Mart and the new Foreign Trade Zone give you competitive advantages in manufacturing, exporting, and importing. *At Your Request* industrial representatives from the Association of Commerce or Greater New Orleans, Inc., will call upon you in person.

NEW ORLEANS LEADS THE SOUTH

ALL RETAIL SALES*

New Orleans	\$456,327,000.00
Houston	455,157,000.00
Dallas	425,163,000.00
Atlanta	375,257,000.00

EFFECTIVE BUYING INCOME*

New Orleans	\$693,694,000.00
Houston	642,974,000.00
Dallas	584,284,000.00
Atlanta	423,332,000.00

NEW ORLEANS EXPORTS (Dollar Value)

1946	\$569,100,000.00
1945	395,900,000.00
1944	285,800,000.00

*Sales Management

SEND FOR A COPY . . .

of our recently completed study, "The Opportunity for the Manufacture of Plastics and Plastic Products in the City of New Orleans," giving more detailed information on the probable possibilities of a New Orleans location.

Address:

GREATER NEW ORLEANS, INC.,

1024 Maison Blanche Bldg., New Orleans



GREATER NEW ORLEANS



QUALITY AT LOW COST



New! ELMES HYDROLAIRS

(Patents Applied For)

**... FAST, ACCURATE,
EASY TO USE, ECONOMICAL
PUMPLESS! MOTORLESS!**

PRICES, f.o.b. Chicago

20-Ton, with 8" x 8" Platen	
Bench-Type.....	\$680.00
Floor-Type.....	\$840.00
30-Ton, with 10" x 10" Platen	
Bench-Type.....	\$770.00
Floor-Type.....	\$900.00
50-Ton, with 18" x 18" Platen	
Floor-Type.....	\$1800.00
Hot Plates and other accessories, extra.	

ELMES

Since 1851

HYDRAULIC EQUIPMENT

One of the *first* new Elmes Hydrolairs to go into service is this 30-ton floor-type press at the Grayhill Company plant in La Grange, Ill. It is used for molding plastic parts for relays, switches, and coils to a *closing dimension accuracy* of $\pm .002"$ on quantity runs.

According to Shop Superintendent Tylinksi, blowing out the molds probably requires as much air as does *actual press operation*. Their compressor shows virtually no indication whatever of added load. During many months, the Hydrolair has performed with *utmost efficiency*, even when operated—as it frequently is—by women.

IDEAL FOR MANY USES

Elmes Hydrolairs are full *power-operated* hydraulic presses—ideal for molding plastics and rubber, for laminating, and for *many other* pressure purposes. They take their power through a flexible hose from any 90-lb., min., shop air line. No worry about foundations or floor loads. Placed *anywhere*. Easy to move. Quiet. Made in bench- and floor-type models. See prices at left. Order now for prompt delivery.

ELMES ENGINEERING WORKS of AMERICAN STEEL FOUNDRIES • 225 N. Morgan St., Chicago 7, Ill.
Distributors in Principal Industrial Centers

METAL-WORKING PRESSES • PLASTIC-MOLDING PRESSES • EXTRUSION PRESSES • PUMPS • ACCUMULATORS • VALVES • ACCESSORIES

KUX

HIGH SPEED PREFORM PRESSES PREFERRED

YES, for high speed automatic production of dense hard preforms, Kux Preform Presses are **PREFERRED** by plastic molders from coast to coast. One of the most widely used models, the new massive Kux "65" produces preforms 3" diameter, has a 3" die fill and applies 75 tons pressure at top efficiency. Designed so that pressure is applied by both top and bottom punches, the Model "65" turns out solid dense preforms which have less tendency to break or crumble during handling. For extra high production of preforms, Model No. 25 Rotary will produce up to 750 tablets of $1\frac{1}{8}$ " diameter a minute. Complete size range of machines in both single punch and rotary punch models is available. Write for illustrated catalog.

MODEL NO. 25

Tablet Dia. $1\frac{1}{8}$ "
Die Fill $1\frac{1}{8}$ "
Tablets per minute
up to 750

MODEL NO. 65

Tablet Dia. 3"
Die Fill 3"
Pressure 75 Tons



KUX MACHINE COMPANY
3926 W. HARRISON STREET • CHICAGO 24, ILLINOIS

PYRO DOES IT AGAIN!

a whistle!!

When called upon by Planters Peanuts to produce a premium in the form of their trademark, "Mr. Peanut," Pyro Plastics Corporation called into play the "know-how" born of years of experience. The result: this unique novelty.

You, too, can see your idea evolve into reality—simply write, phone or wire today and receive the BEST in design, engineering and production services.



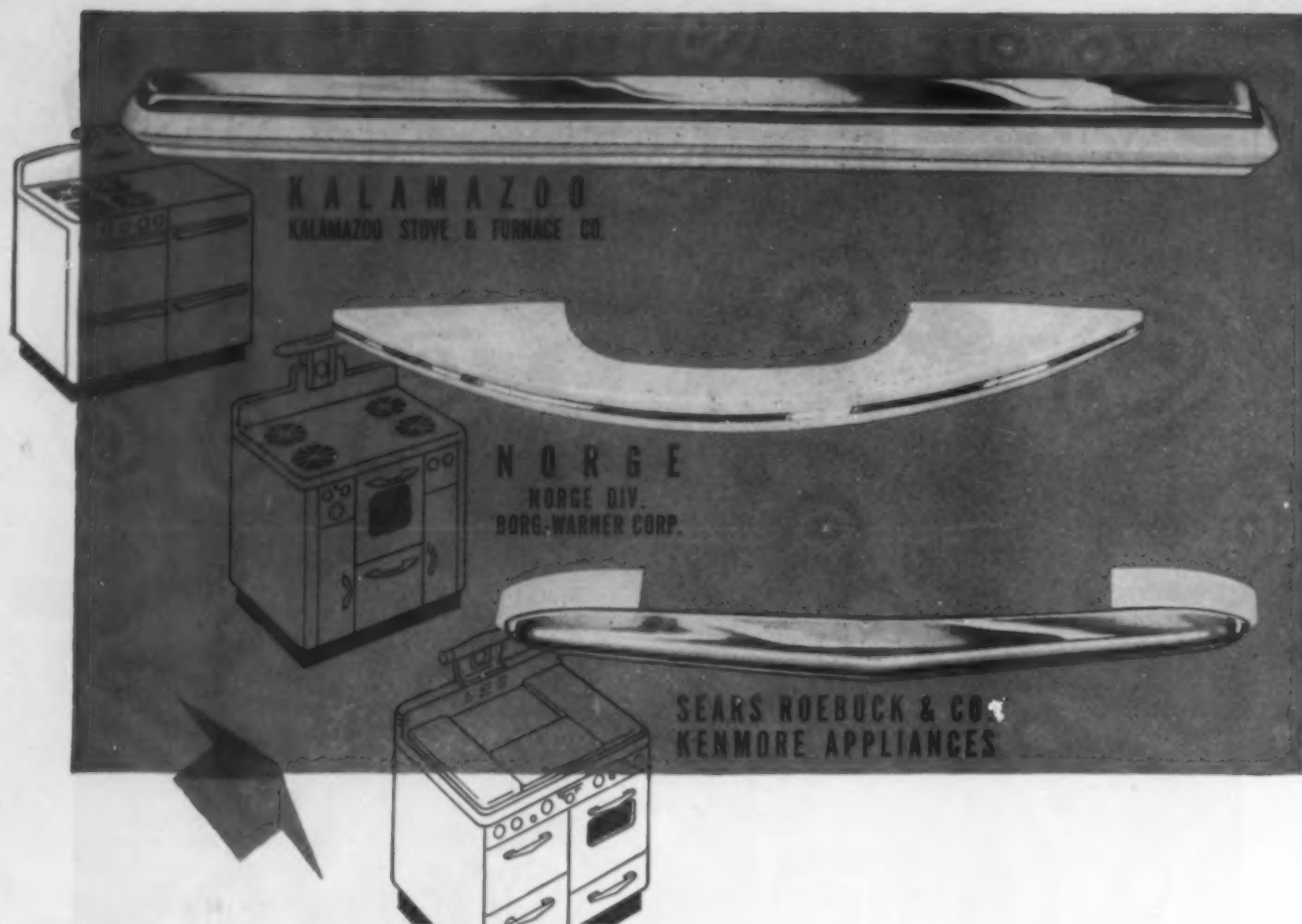
Pyro

PLASTICS CORPORATION
WESTFIELD, NEW JERSEY

Custom molders of plastic products. Complete facilities to meet your every need.

AUGUST • 1947

53



Leading Stove Builders use **GRIGOLEIT** Handles



"TWENTY YEARS IN | PLASTICS"

THE GRIGOLEIT COMPANY

**744 E. NORTH STREET
DECATUR 80, ILLINOIS**

We're proud of the fact that so many of the nation's leading stove manufacturers specify "handles by Grigoleit."

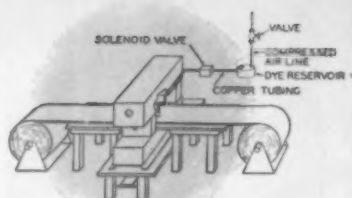
There's a reason for this choice: Two decades of plastic experience, complete manufacturing facilities, and production supervision by expert technicians assure product satisfaction.

We have our own tool and die shops, our own metal-working division for the perfect blending of metal and plastic . . . and the latest equipment for thermo-setting and thermoplastic molding.

The handles illustrated are made exclusively for the manufacturers as illustrated. However, we do maintain a large stock line of standard handles, or we will make special handles to your specifications.

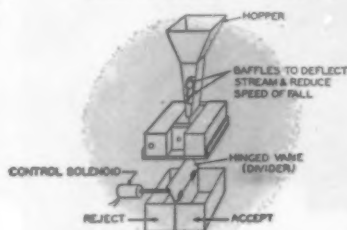
Catalog available on request.

PAID FOR ITSELF THE FIRST DAY!



INSPECTION OF CONTINUOUS STRIP

An ideal set-up for plastic sheeting and film. When metal is detected, air pressure sprays dye on the contaminated portion. Many modifications possible to fit varying needs.



INSPECTION OF FALLING MATERIAL

A good way to inspect molding powders, fillers, and resins. When metal is detected, the hinged vane deflects the stream into the reject bin.

RCA Electronic Metal Detector scans plastic rolls, protects calender at National Automotive Fibres

"In one operation our RCA electronic metal detector saved us \$2,000," reports National Automotive Fibres, Inc., Trenton Division.

"By detecting a fairly large piece of tramp metal embedded in the plastic scrap we were processing, it prevented severe damage to our calender roll . . . saved the cost of an expensive regrinding operation."

In this plant, a preliminary visual inspection of scrap plastics eliminates obvious pieces of metal. After the plastic has gone through the milling roller, the rolls are carried on a conveyor belt through the detector's inspection aperture. If metal is present, a bell rings, the roll is removed and unwound, and the particle is eliminated.

This modern electronic equipment can spot every type of metal and alloy—magnetic or nonmagnetic, regardless of its depth in the material. Reports on units in use for more than two years attest to its reliability—even in detecting particles as small as 70 thousandths of an inch in diameter!

Here's a unique opportunity to protect your valuable tools, dies, molds, engraved rolls, and calenders . . . reduce lost production time . . . safeguard product quality . . . preserve customer good will. It will pay you to get complete information immediately. Write Dept. 55-H.



INDUSTRIAL ELECTRONICS

RADIO CORPORATION of AMERICA

ENGINEERING PRODUCTS DEPARTMENT, CAMDEN, N.J.

In Canada: RCA VICTOR Company Limited, Montreal



**QUADRUPLED CAPACITY
FOR BETTER SERVICE WITH
A BETTER PRODUCT!**



CAPACITY for sheets, tubes and rods at the Formica factory has been multiplied by four since the war began.

New types of equipment, more efficiently arranged, have prepared the plant for production on a scale never attempted in the laminated industry.

At the same time new types of resinoids and new types of bases have made possible the production of better and more efficient materials better adapted to specific jobs they are expected to perform.

Machining and finishing equipment for electrical parts has been expanded in proportion. So you can send your blueprints here with confidence that when your order is placed you will get promptly, uniform materials of high quality, produced in the most efficient way by the finest manufacturing equipment, manned by the most competent staff in the industry.

THE FORMICA INSULATION CO., 4673 SPRING GROVE AVE., CINCINNATI 32, OHIO



■ When you need shirts, do you just dash into a store and say to the chap, "Wrap me up a couple of shirts!" Or do you look at the brand, insist on one you know!

Our guess is you probably ask for the brand you have confidence in, just to eliminate a lot of trouble and expense.

Why take a similar chance when you're buying molded plastic parts? Better play safe and have

the parts you need molded from a name brand plastic, by a molder with a long-standing reputation for good molding. (Boonton's one of these molders.)

After all, it's money out of your pocket if your product doesn't perform either on quality or on delivery.

Be sure to LOOK AT THE NAME BEHIND THE CONTRACT.

Molded at Boonton Means Good Plastic Molding



FOR OVER 25 YEARS
CUSTOM ENGINEERS
OF MOLDED PLASTICS

BOONTON MOLDING COMPANY

MOLDERS OF MOST PLASTICS BY MOST METHODS

122 EAST 42nd ST., NEW YORK 17

SUITE 1716-M
MURRAY HILL 6-8540

FACTORY—BOONTON, New Jersey



Washington



** One of a series of advertisements based on industrial opportunities in the states served by the Union Pacific Railroad.*

WATER POWER is one of Washington's most important industrial advantages. Two of the world's greatest dams, Grand Coulee and Bonneville, make it possible to offer industry unusually low electric power rates.

Lumber, coal, iron, nickel, chrome, aluminum—and other basic metals—are available "on the ground floor" for industrial purposes.

The state's tremendous yield of fruits and vegetables, together with seafood, offers an imme-

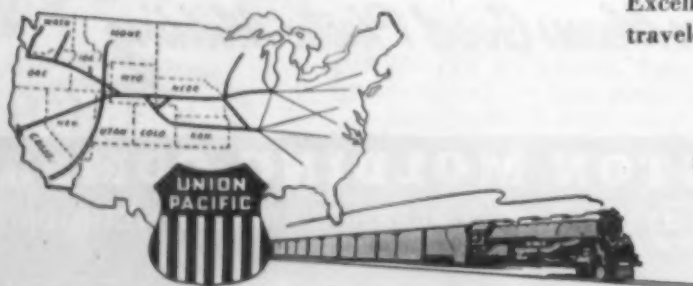
diately supply to concerns engaged in processing and packing.

Washington's population has shown a great growth; providing a large local consumer market and source of industrial workers.

The state also is a gateway to the Orient for export business.

From a viewpoint of good living, the Evergreen State offers a year 'round scenic playground... excellent educational and cultural advantages.

Excellent rail transportation, for shippers and travelers, is provided by Union Pacific.



** Address Industrial Department, Union Pacific Railroad, Omaha 2, Nebraska, for information regarding industrial sites.*

UNION PACIFIC RAILROAD

THE STRATEGIC MIDDLE ROUTE



PRECISION AND QUALITY

YARDLEY "TRU-SIZE" TUBING

Speed up production, cut costs, by using only tubing of absolute uniformity. Polarized light tests consistently prove Yardley "Tru-Size" tubing has proper density and hardness characteristics plus freedom from strain patterns.

Tolerances are held to plus or minus .003" assuring better alignment when used with injection molded parts.

You can count on better machining qualities, high-dimensional stability and high-gloss, mold-like finish when you use "Tru-Size" tubing.

Made in continuous lengths, standard wall thicknesses, O. D. $\frac{3}{8}$ " to 2". Used everywhere by particular manufacturers for pen and pencil barrels, radio and electrical parts, instrument handles, irrigation tubing, better toys, novelties and many other fabricated products.

Send for bulletins on stock shapes. Consult us on special shapes.

Y **ARDLEY** *Plastics Co.*

142 Parsons Ave. • ADams 9135 • Columbus 15, Ohio



DURITE PLASTICS

MOLDING COMPOUNDS

**THERMOSET PHENOLIC
RESIN COMPOUNDS** readily
withstand repeated exposure to
heat and pressure, conventional clean-
ing solvents, and laundry solutions.
*Wise buyers and molders specify them
for molding quality buttons of excep-
tional lasting strength, durability, and
smart appearance.*

DURITE PLASTICS INCORPORATED • 5000 Summerdale Ave. • Philadelphia 24, Pa.

INJECTION MOLDING ENGINEERING ... ON THE MOVE!

Obviously there's more to molding efficiency than the externals of a machine. Fellows Engineering, combined with Leominster's years of practical experience in the plastic industry, has resulted in molding efficiency such as » » 45 lbs. per hour instead of 22 . . . from the same machine » Built-in pyrometer equipment . . . for the first time » Variable Injection pressure, when required » Simplest possible die alignment » » the best of machines backed by a field service to match. Fellows 50 years' experience in the building of precision equipment guarantees a product to the customer's satisfaction.

For further details contact the Fellows Gear Shaper

Co., Plastic Machines Division, Head Office and Export

Dept., Springfield, Vermont. Branch Offices: 616 Fisher

Bldg., Detroit 2 or 640 West Town Office Bldg.,

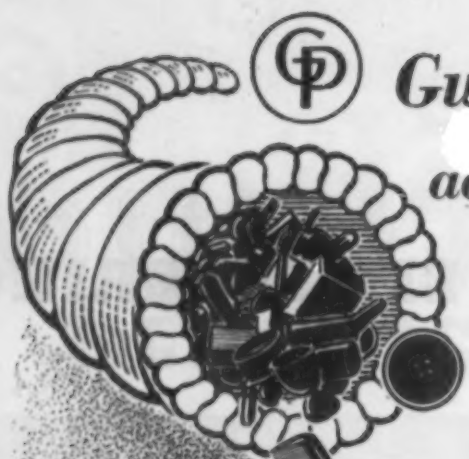
Chicago 12. New England Distributor, Leominster Tool

Co., Leominster, Mass.



Fellows

LEOMINSTER
injection molding equipment



Guaranteed Quality Powders *add extra profits to Mass Markets*

In the plastic "Horn of Plenty" there are hundreds of products which can be produced at lower cost, with perfect appearance and essential properties. . . . For these mass-market items of everyday utility you will find GP Thermo-plastic Injection molding powders entirely suitable.

IF YOU MAKE THESE TYPES OF PRODUCTS

Compare the end-use value of GP molding powders with what you have been using . . . check your cost figures with the value and economy made available by the skillful blending of Gering's plastic technicians.

Your inquiry will be given full and frank reply—without obligation—as to the suitability of GP Regular or Special Grade powders and the economies involved.

1922
25th
ANNIVERSARY
1947

Large scale producers—
**EVERY TYPE THERMOPLASTIC
INJECTION POWDERS**
CELLULOSE ACETATE—POLYSTYRENE—
ETHYL CELLULOSE—BUTYRATE—VINYL & ACRYLIC

Write us for details; or
Telephone CRanford 6-2900
Cable Address: "Gering" Kenilworth, N. J.



GERING PRODUCTS, Inc.

NORTH SEVENTH ST.

KENILWORTH, N. J.

"Masters of Magic in Thermoplastic conversion"



TO INCREASE PIECE PRODUCTION...

Use Your Present Molds On The *New* G. & L. Vertical Plastics Injection Machine

- Accommodates Deep or Shallow Molds
- Uses Center or Side Knockout Pins
- Automatic Knockout At Any Point

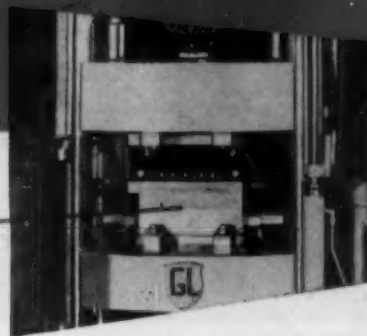
Your present molds, as well as new molds, will produce more pieces when used on a Giddings & Lewis Vertical Plastics Injection Machine. This is accomplished, in part, by a 12" variable die opening which permits controlling the length of the machine stroke to suit deep and shallow molds.

With either center or side knockouts available, any type of conventional mold may be used on the new G. & L. machine. The knockout is automatically engaged at any point during the die opening stroke. As a result, the piece is ejected before the die completely opens.

Single Point Adjustment Provides Precision Setting for Stationary Die Plate

A removable hand crank operating a single worm and gear elevates and lowers the stationary die plate. Precision adjustment to .001" is possible

Any type mold may be used on the new G. & L. Vertical Plastics Injection Machine.



through means of a graduated dial located on the crankshaft which indicates the die plate travel. One point adjustment speeds machine set-ups, and guarantees absolute parallelism between stationary and movable die plates.

The new G. & L. Vertical Plastics Injection Machine offers many profitable molding advantages. Ask Giddings & Lewis engineers.

Check These Advanced Machine Features That Produce More Profit

1. Simple and rapid substitution of heating cylinders prevents loss of time and material in purging.
2. Practical insert molding is possible because of vertical construction.
3. Mold handling is simplified.
4. Vertical machine construction conserves valuable floor space.
5. Interlocked circuits and full automatic safety gate insure against accidents.
6. Vertical strain rods guide die plates only, thus eliminating sag from the weight of die plates and molds.
7. Only one hydraulic cylinder is used to open and close dies and inject plastics material—low maintenance results.



GIDDINGS & LEWIS MACHINE TOOL COMPANY

PLASTICS DIVISION

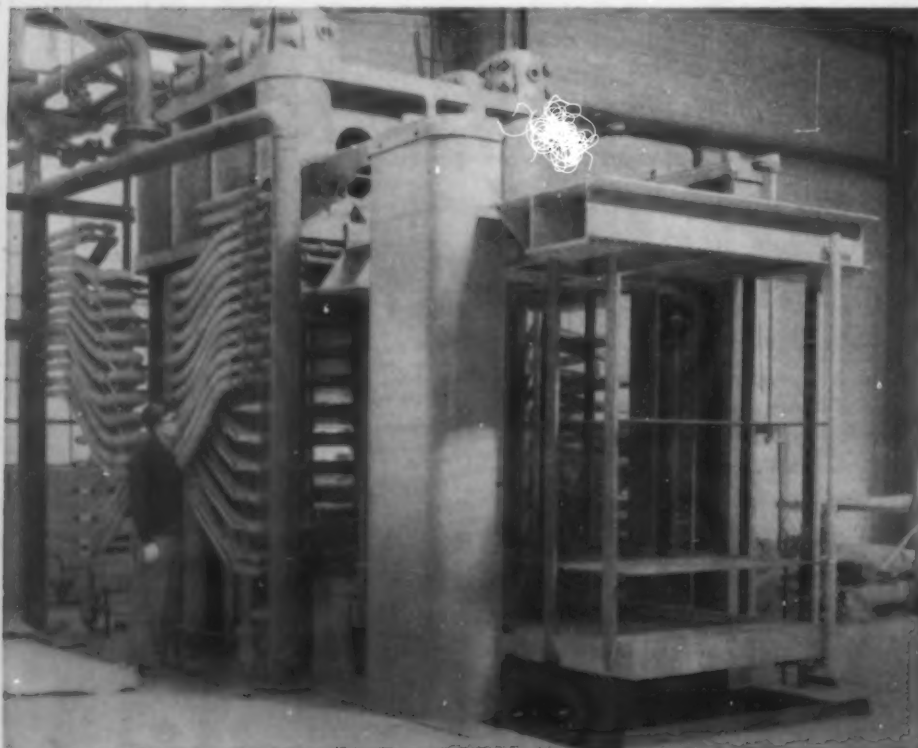
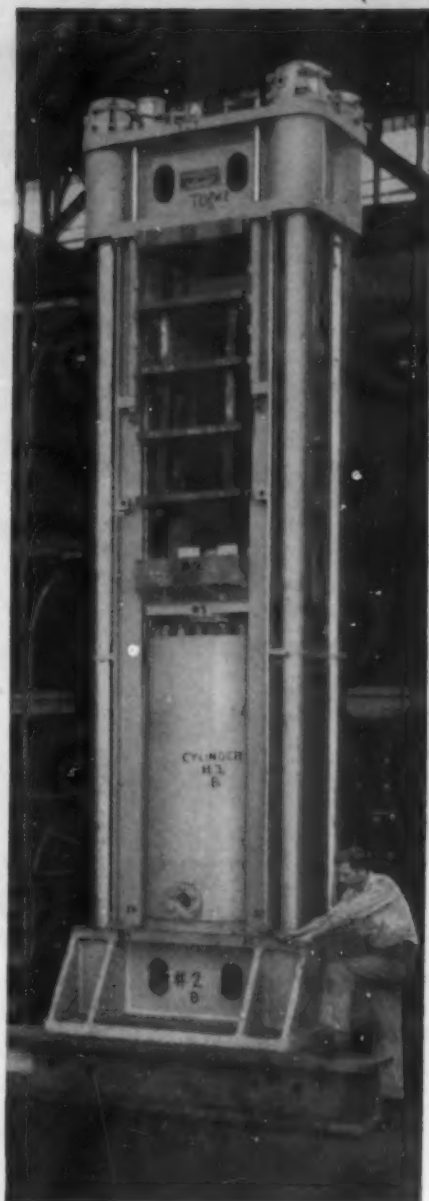
FOND DU LAC, WISCONSIN U.S.A.

When it's a BETHLEHEM PRESS ...it's built RIGHT!

Each Bethlehem hydraulic press is a "custom" unit, planned and dealt with individually. Each has the close attention of qualified engineers, from blueprint to finished machine. When you order a press from Bethlehem, you get a job that is done thoughtfully . . . carefully . . . *right!*

Bethlehem units can be furnished with or without self-contained or separate hydraulic power systems. Such items as pumps, accumulators, valves, intensifiers, shock-absorbers, and accessories can be included or omitted, according to your order.

Let us start our work with you in the planning stage. In that way, we shall be better prepared to follow your specifications.



HYDRAULIC PRESSES

for

PLASTICS
WALLBOARD
FIBER BOARD
VULCANIZING
METAL-FORMING
and other applications

BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by
Bethlehem Pacific Coast Steel Corporation





and Byrd for
Corporation.

Handle with Color!



• "Chocolate Sundae!" "Double Frosted!" "Pie a la Mode!" • Quick as a wink the clerk reaches for the right scoop because the brilliant color of the Chemaco Ethyl Cellulose handle signals the size of the portion. • And this color will *remain* bright and clear because it goes all the way through. • Let the clerk drop the scoop. The handle will not chip or mar, for Chemaco Ethyl Cellulose is amazingly resistant to impact...more so than any other cellulosic. • It also has an exceptionally low water absorption factor as well as a new, high-lustre finish. • In addition, low specific gravity and recent price reductions mean more pieces per pound at lower cost. • Through Chemaco Ethyl Cellulose and its new formulations you can obtain for *your* mass production products the quality of a custom made article. • Write for information and our new folder.

Chemaco Corporation, Berkeley Heights, N. J. Branch office in Cleveland.

Chemaco

ETHYL CELLULOSE PLASTIC MOLDING POWDERS

Also Manufacturers of Cellulose Acetate and Polystyrene

THE CHAMP

Heats 6 Pounds (96 ozs.) in ONE MINUTE

*That's Performance
in Preheating Equipment*

Whenever you see the THERMALL Diamond on an HF Heating Unit, you can bet your last dollar on the utmost in performance.

We'll gladly give you technical and engineering data about every size THERMALL Unit. Users say that we are conservative in our power ratings. They tell us that THERMALL HF Heating Units consistently deliver more than rated power; preheat faster than we claim.

Time after time, users have said they were "amazed at THERMALL performance."

If you have a pre-heating or molding problem of any kind and want technical advice or assistance—write us. We will assist you by assigning one of our technical representatives to your problem without obligation.

When you want a job done day in—day out, remember that

THERMALL means PERFORMANCE



The THERMALL CHAMP occupies only 20 x 30 inches of your floor space. Heats 96 ounces compound to molding temperature in 1 minute. Completely portable.

Bulletin P7 gives specifications and details of all THERMALL HF Units. It's free, on request

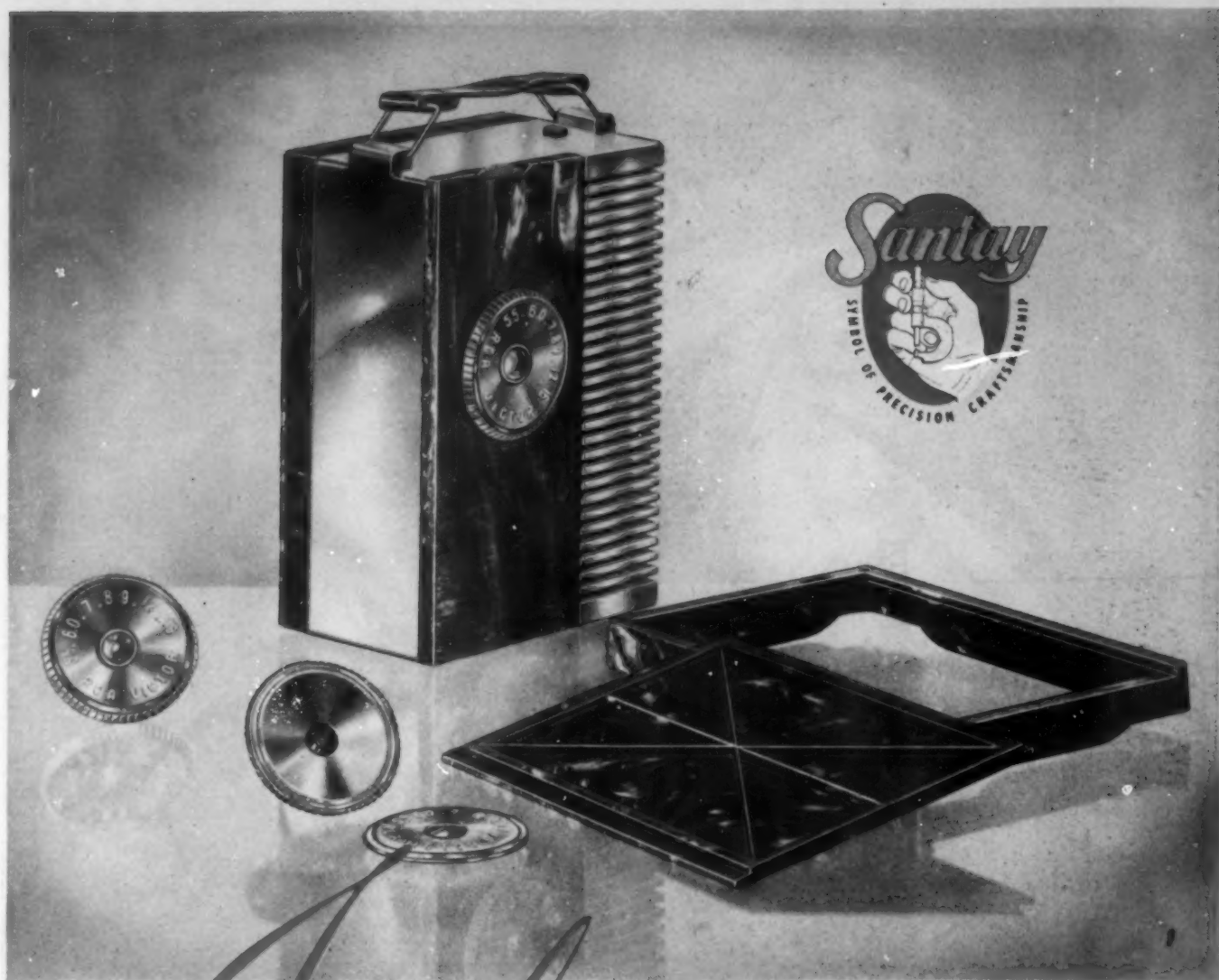
W. T. LAROSE & ASSOCIATES

635 Second Avenue

Troy, New York

Representatives in All Principal Cities

Export: Omni Export Corp., 40 East 34th St., New York 16, N. Y.



A Jewel IN RADIO

A tiny golden radio gem only $6\frac{1}{4}$ inches high! When R.C.A. styled this *deluxe* Personal Radio they immediately employed the engineering talent and precision craftsmanship of Santay Corporation to cooperate in the designing and engineering of the required plastic parts. The result of this combination of skills is illustrated here by 1. The interlocking lid and frame of lustrous variegated polystyrene and 2. The jeweled watch dial effect of the gold plated tuning knob molded of clear lucite. Plastic parts and metal tie in with watchmaker's precision that reflects the ingenuity and skill of Santay craftsmen.

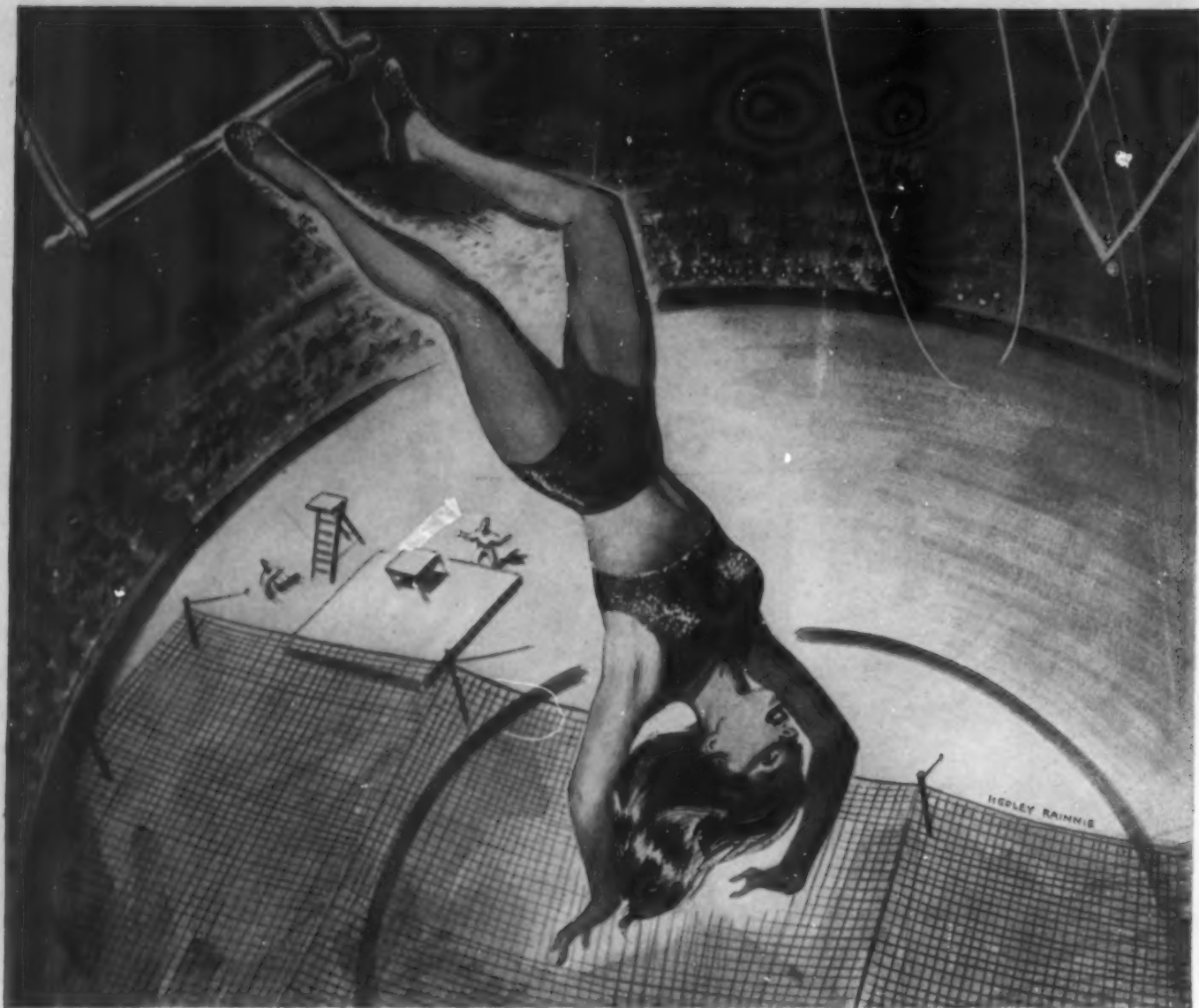
Knowledge gained thru years of experience in injection molding of all thermoplastic materials is yours for the asking. Just bring or send in your plastic problems to Santay.

You can depend upon getting the correct answer from this finer, more reliable source.

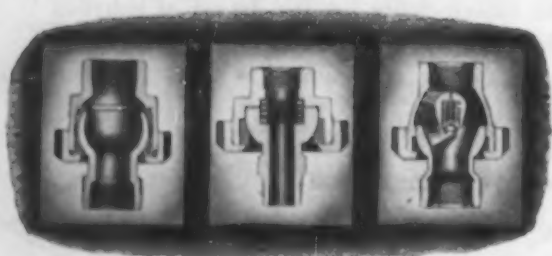
INJECTION MOLDING AND METAL STAMPING • ELECTRO-MECHANICAL ASSEMBLIES

SANTAY CORPORATION, 355 NORTH CRAWFORD AVE. CHICAGO 24, ILLINOIS

REPRESENTATIVES: POTTER & DUGAN, INC., 29 WILKESON STREET, BUFFALO 2, NEW YORK • PAUL SEILER, 7729 CORTLAND AVENUE, DETROIT 4, MICHIGAN • QUEISSER BROS., 110 E. NINTH STREET, INDIANAPOLIS 2, INDIANA



FOR PROTECTION FROM IMPACT — Fuel Lines need Barco Joints



The impact of constant vibration in mechanical operation can play havoc with fuel line systems, unless you compensate for such action with Barco Flexible Joints. Providing for expansion and contraction, Barco Joints give flexibility to counteract stress and absorb the shocks that threaten leakage or breaks in vital fluid lines.

Since their introduction over 30 years ago, Barco Joints have grown steadily in favor—and today they are standard and universally accepted. Write for information about applications in your own particular field. Barco Manufacturing Co., Not Inc., 1809 Winnemac Avenue, Chicago 40, Illinois.

BARCO FLEXIBLE JOINTS

FREE ENTERPRISE—THE CORNERSTONE OF AMERICAN PROSPERITY

In Canada: The Holden Co., Ltd., Montreal, Canada.

"MOVE IN



EVERY

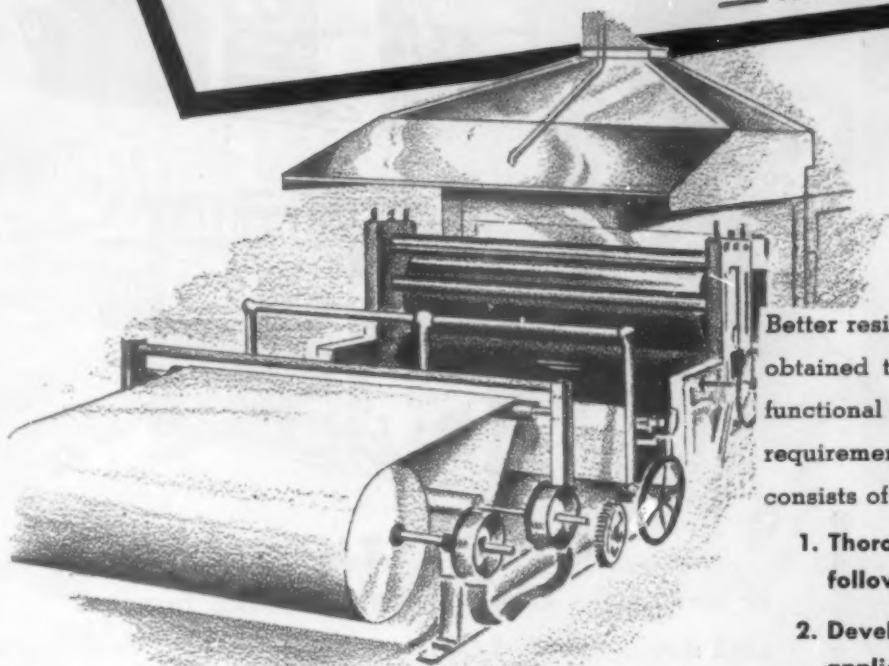


DIRECTION"

*Not just a swivel joint
...but a combination of
a swivel and ball joint
with rotary motion and
responsive movement
through every angle.*

for improved laminates use
INTERLAKE

Resineering



Better resins for impregnation of laminates are obtained through Interlake *Resineering*—the functional engineering of a resin for the specific requirements of each job. Interlake *Resineering* consists of:

1. Thorough analysis of your resin problem followed by our recommendation.
2. Development of a resin for your particular application.
3. Testing this resin on the job, in your plant, working with your operating men.
4. Stabilizing its production for continuous uniformity in performance.

Resins produced by this complete Interlake service cost no more, yet insure improved product quality. The Interlake Chemical Corporation, Union Commerce Building, Cleveland 14, Ohio.

Call in an Interlake Resineer if you:



BOND wood, veneer, coresstock, cellulose waste or fibrous materials.

SURFACE wood, paper or fabric.

LAMINATE fabric, paper or wood.

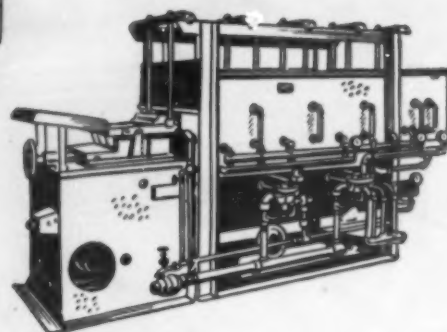
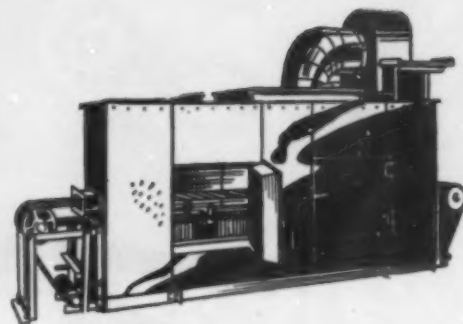
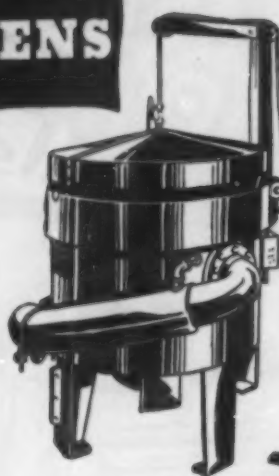
IMPREGNATE wood, plaster or other cellular materials.

**INTERLAKE
CHEMICAL**

Corporation

• PRODUCTS FROM COAL •

INDUSTRIAL FURNACES & OVENS



TO BUY THESE
or any of the other 10,000 industrial furnaces
and ovens (over 4,000 specifications)
**YOU START WITH
THIS WAA BOOK**

*If you have not received your
copy of this new WAA booklet,
clip and mail this coupon—NOW!

TO: WAR ASSETS ADMINISTRATION
Machinery and Industrial Equipment
Division, Washington 25, D. C.

Please send me your Booklet Entitled
"Industrial Furnaces and Ovens"

NAME _____
TITLE _____
FIRM _____
ADDRESS _____
CITY _____ STATE _____

HERE'S WHAT YOU DO—

Be sure you have your copy of this valuable booklet.*

- ... Determine your requirements.
- ... Fill in the "Specification Tear Sheet" in the back of the WAA booklet pictured at left.
- ... Send it to the War Assets Administration—Washington, D. C.

WAA will then carefully screen its inventory to find the furnace or oven you specify, and will arrange for inspection before purchase. It's as easy as that!

TOCCO HEAT TREATING FURNACES ARE ALSO AVAILABLE

OFFICE OF GENERAL DISPOSAL

WAR ASSETS ADMINISTRATION



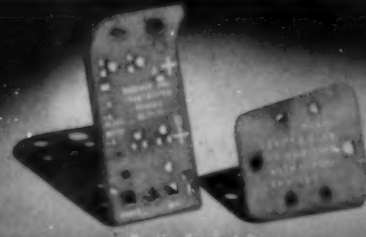
Offices located at: Atlanta • Birmingham • Boston • Charlotte • Chicago
Cincinnati • Cleveland • Denver • Detroit • Grand Prairie, Tex. • Helena
Houston • Jacksonville • Kansas City, Mo. • Little Rock • Los Angeles • Louisville • Minneapolis
Nashville • New Orleans • New York • Omaha • Philadelphia • Portland, Ore. • Richmond
St. Louis • Salt Lake City • San Antonio • San Francisco • Seattle • Spokane • Tulsa

CUSTOMER SERVICE CENTERS IN THESE AND MANY OTHER CITIES. 1287

What'll You Have!



Dielectric? Synthane is an excellent electrical insulator. Dielectric strength is high, power factor and dielectric constant low. What makes Synthane the useful dielectric it is, is its strength and the comparative ease with which it can be punched or machined into the variety of parts needed on radio and electrical equipment.



Radio Socket Box



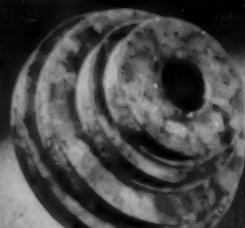
Strength? Synthane seldom is asked to compete with metals and alloys in strength. It is exceptionally strong for its weight and will compare favorably with metals for strength on a weight basis. Synthane is a member of that family of plastics highest in tensile, compressive, flexural and impact strengths.



Coupling Cross



Light Weight? One of the most important properties of Synthane is its light weight. Although Synthane weighs only $\frac{1}{2}$ as much as aluminum its strength is ample for electrical applications and sufficient for most mechanical uses. Light weight plus other virtues accounts for its wide use in aviation.



Vee Belt Pulley



Anti-friction? Two grades of Synthane laminated have anti-friction and anti-wear characteristics built in, due to the incorporation of a special graphite. Available in sheets, rods, tubes and in special shapes and fabricated parts. Possibilities for this material are worth investigating.



Ball Bearing Retainers



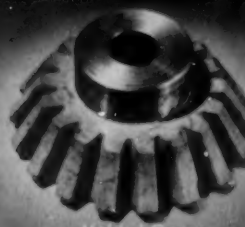
Corrosion Resistance? Perhaps you can take advantage of Synthane's immunity to most oils and solvents, Synthane's resistance to various concentrations of acids and salts. Often used because it has longer life per dollar than other materials, including cost of replacement.



Plating Tank Parts



Combination? Are you looking for two, three, four or even more properties combined in one material? Synthane may do the trick. It has all of the advantages above plus hardness, abrasion resistance, stability under temperature or moisture conditions, ease of machining, and many others.



Molded Gears

SYNTHANE CORPORATION, OAKS, PENNA.

Representatives in all principal cities

Plan your present and future products with Synthane Technical Plastics • Sheets
Rods • Tubes • Fabricated Parts • Molded-laminated • Molded-macerated

SYNTHANE
S

Plastics where plastics belong using insulating and mechanical qualities

Synthane, a phenolic plastic, has a rare combination of mechanical, chemical, and electrical properties that fit it for a host of useful applications. It is corrosion and moisture resistant, dense, structurally strong and may be easily worked. An excellent electrical insulator, Synthane is extremely light (about one-half the weight of aluminum).

An example of the use of technical plastics is this timing device which uses Synthane for its cams.



The Cam Timer (above) is the heart of an automatic system designed to control the flow of exhaust gases through a stack in a lampblack plant.

The timing cams are made of Synthane because Synthane is, first of all, an effective electric insulator. Synthane cams operate noiselessly, virtually without friction, and calibrations are easily printed on them by the Synthographic process.

If there's a use in your plant for Synthane, why not let us help you before you design? Write for our complete catalog of Synthane plastics today! Synthane Corporation, 8 River Road, Oaks, Pa.

SYNTHANE



where Synthane belongs

DESIGN • MATERIALS • FABRICATION • SHEETS • RODS • TUBES
FABRICATED PARTS • MOLDED • MACERATED • MOLDED-LAMINATED

"Save us \$50
worth of
Assembly Time
per unit"
...says
THE GLOBE WERNICKE CO.

Summary of report by James O. Peck Co., independent investigators, of assembly savings made with Phillips Screws . . . another in the series of assembly studies at prominent plants.

● "We manufacture these units for the Iceberg Refrigerated Locker Systems, Inc.," explained the assembly head of The Globe Wernicke. "Our engineering department specified Phillips Screws throughout, and we're glad they did."

"Save us \$50 worth of assembly time per unit. We can take full advantage of power drivers with Phillips Screws. No finder is needed and there's no fumbling such as we'd have with slotted screws. Since each unit requires thousands of screws, \$50 is a conservative estimate of how much we save per unit by using Phillips Screws."

"Upside down or sideways . . . Makes no difference. Screws are driven with the unit in one position so that much of the driving is sideways or upside down. Difficult with slotted screws but very easy with Phillips Screws."

"No gouging or burring. Before we settled on Phillips, we tried out a lot of other type screws and found the driver would jump out and gouge the Masonite panels or burr the heads. Phillips Screws ended that, gave us better driving time with our power drivers."

Help yourself to money-saving ideas for your assembly operations. Write for the full report on The Globe Wernicke Co. and other assembly studies . . . covering metal, wood and plastic products. Use the coupon.

PHILLIPS *Recessed Head* SCREWS

Wood Screws • Machine Screws • Self-tapping Screws • Stove Bolts

American Screw Co.
Central Screw Co.
Continental Screw Co.
Corbin Screw Div. of
American Hdwe. Corp.
Elee Tool & Screw Corp.
The H. M. Harper Co.
International Screw Co.
Lamson & Sessions Co.
Milford Rivet and Machine Co.
National Lock Co.

24 SOURCES

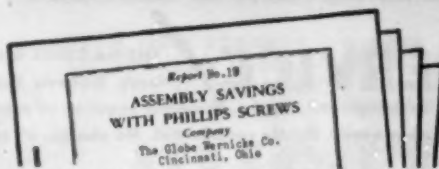
National Screw & Mfg. Co.
New England Screw Co.
Parker-Kalon Corporation
Pawtucket Screw Co.

Phoell Manufacturing Co.
Reading Screw Co.
Russell Burdall & Ward
Belt & Nut Co.
Scovill Manufacturing Co.
Shakeproof Inc.
The Southington Hardware Mfg. Co.
The Steel Company of Canada, Ltd.
Sterling Bolt Co.
Stronghold Screw Products, Inc.
Wolverine Bolt Company

THE ICEBERG REFRIGERATED LOCKER COMPANY's equipment for frozen food storage is made up in combinations of basic units like this 8-section (10 six-cubic-foot drawers to a section) locker.



The complicated assembly of the drawer of the ICEBERG REFRIGERATED LOCKER . . . made without driver skids to injure work or hands, thanks to Phillips Screws. Most of the thousands of Phillips Screws used in this assembly are Type "A", self-tapping, and are power driven up, down, and sideways.



• Phillips Screw Mfrs., c/o Horton-Noyes
• 1800 Industrial Trust Bldg.,
• Providence, R. I.

• Send me reports on Assembly Savings with Phillips Screws.

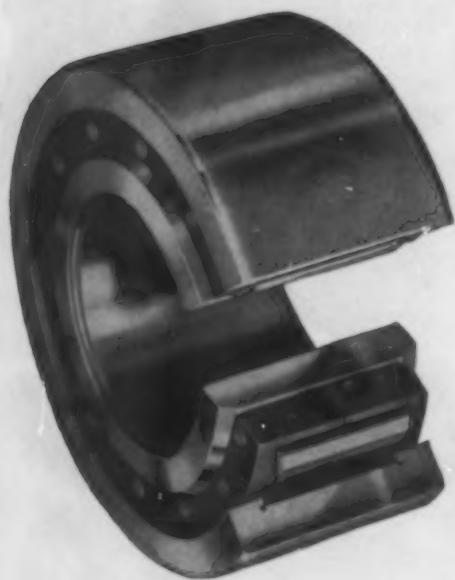
• Name

• Company

• Address

REDUCE SHUT-DOWNS

ROLLWAY *with* Right-Angle Loading



**Cut Maintenance Costs
Get Longer Bearing Life**

Right-Angle Loading splits compound loads into the two component parts of pure radial and pure thrust . . . and carries each of these components on separate bearing assemblies.

ROLLWAY RIGHT-ANGLE-LOADED BEARINGS

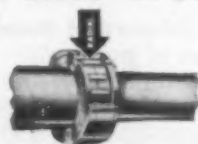
WHAT THEY DO

Prevent wedging of rollers and pinch-out • Reduce roller end-rub, with its wearing friction • Hold starting and operating torque at a minimum • Eliminate complicated stresses • Since only pure radial or pure thrust loads can be imposed on any single bearing assembly, unit pressures are substantially reduced • Since all loads are carried at right angles to the roller surface, compound or oblique loads are avoided, and so are the resultants of the oblique loads • Right-angle loading permits Rollway Bearings to carry greater radial or thrust load capacity in any given dimension • Right-angle loading assures solid cylindrical rollers of greater roller mass and uniform roller cross-section . . . greater resistance to shock loads and vibration . . . longer life expectancy under continuous heavy-duty service.

FREE SERVICE!

Get the RIGHT Bearings for Your Particular Needs. Rollway Engineers will gladly make necessary calculations, drawings and supply • other required information for a complete understanding of your bearing needs. Strictly confidential. No charge, of course.

HOW THEY WORK



When it's pure radial load, the load bears at a right angle to the rollers.



When the load is pure thrust, it bears at a right angle to the rollers.



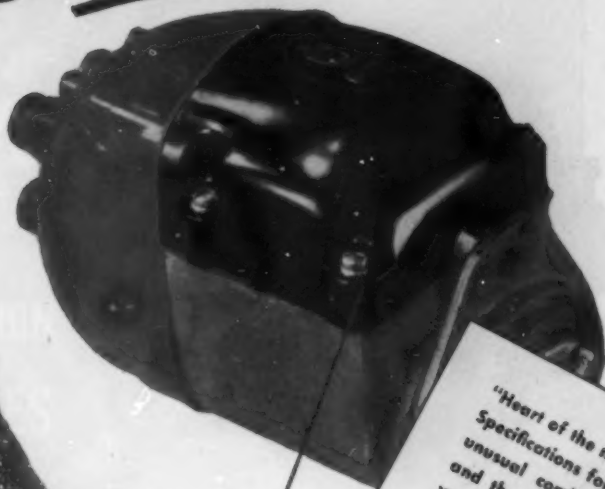
When radial and thrust are combined, the two loads are resolved separately at a right angle to the rollers.

ROLLWAY BEARINGS

ROLLWAY BEARING COMPANY, INC., SYRACUSE, N. Y.

SALES OFFICES: Philadelphia • Boston • Pittsburgh • Cleveland • Detroit • Chicago • Minneapolis • Houston • Los Angeles

20,000 volts -
that's some heart-beat



"Heart of the motor" is the J. I. Case magneto. Specifications for its exposed cover call for an unusual combination of dielectric properties and the rugged strength to withstand heavy wear and tear. P.S. Versatile KYS-ITE is Case's choice.

Any equipment headed for "life on the farm" can expect plenty of rough treatment. The Case Company, knowing that, picked KYS-ITE primarily for outstanding durability coupled with dielectric properties.

Other manufacturers may turn to KYS-ITE for its integral color and finish, its unusual resistance to abra-

sion . . . or because it is impervious to mild acid or alkali solutions. Again, KYS-ITE may get the bid because it is non-reverberating and non-resonant—a poor conductor of heat and cold.

How about you? KYS-ITE may well have the properties your product requires—for it offers a combination of properties unlike any other material.

If molding is your problem, call on KYS-ITE. New equipment and expanded facilities have increased our capacity for handling custom molding work. Advisory service without obligation—why not write us today.

KEYES FIBRE COMPANY
420 Lexington Avenue
New York 17, New York
Plant at Waterville, Maine

KEYES
MOLDED PRODUCTS

KYS-ITE

Reg. U. S. Pat. Off.

Preformed Plastic combining Long-fibered Wood Pulp and Synthetic Resin





Extra Hands... to Aid Industry—and You!

HANDLING COMPLEX PROBLEMS in the chemical process industries makes many a purchasing and production executive wish he had as many extra hands as this ancient Hindu idol to help him through—and he has!

THEY ARE HIS... and yours—in the cooperation and assistance of chemists, engineers, and technicians on General Chemical Company's Technical and Engineering Service staffs. These experts are well qualified by technical training and by practical industry-wide experience to offer sound, constructive advice in many ways—whether your problems deal with

industrial, scientific or agricultural chemicals.

THEY CAN FURNISH pertinent data on properties, grades, and packaging of General Chemical products... advise on materials and methods for handling and storing them... consult on their applications to your operations... and work with you in the development of special chemicals to meet your individual requirements.

When "extra hands" such as these can help you, just phone or write to the nearest General Chemical Company Sales and Technical Service Office listed below.

GENERAL CHEMICAL COMPANY

40 RECTOR STREET, NEW YORK 6, N. Y.



Sales and Technical Service Offices: Albany • Atlanta • Baltimore • Birmingham
Boston • Bridgeport • Buffalo • Charlotte • Chicago • Cleveland • Denver
Detroit • Houston • Kansas City • Los Angeles • Minneapolis • New York
Philadelphia • Pittsburgh • Providence • San Francisco • Seattle • St. Louis
Wenatchee (Wash.) • Yakima (Wash.)

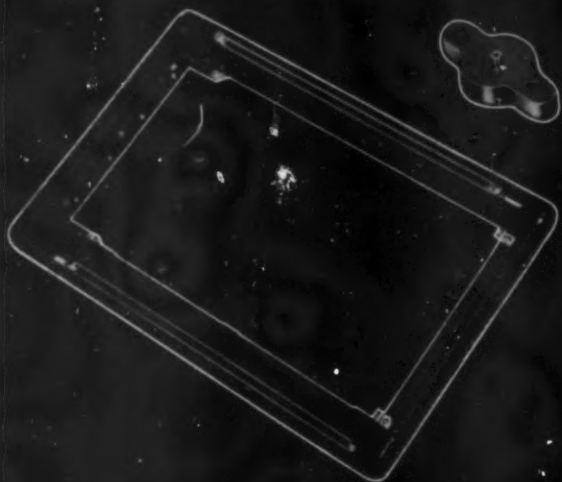
In Wisconsin: General Chemical Wisconsin Corporation, Milwaukee, Wis.

In Canada: The Nichols Chemical Company, Limited
Montreal • Toronto • Vancouver



BALDWIN

**SOUTHWARK
COMPRESSION
MOLDING PRESSES**



Standard Line—"Custom" Features...

- ★ HY-SPEED ADVANCE
- ★ ADJUSTABLE AUTOMATIC SLOW-DOWN
- ★ RAPID RAM RETURN
- ★ EXTRA SAFETY CONTROLS:

Provide protection for the operator
Prevent damage to mold and press

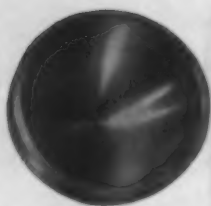
Standard models available from 50 tons to
300 tons capacity. Ask for Bulletin 251.

BALDWIN

HYDRAULIC MOLDING PRESSES

The Baldwin Locomotive Works, Philadelphia 42, Pa., U. S. A.
Offices: Philadelphia, New York, Boston, St. Louis, Chicago, Bir-
mingham, Houston, Cleveland, Detroit, San Francisco, Washington,
Seattle, Pittsburgh.

Ask for NEW Bulletin 251



BORED CONTOURS AIR-TRACED

for greater accuracy

Molds, dies and similar contour boring jobs are a "natural" for the Monarch Air-Tracer.

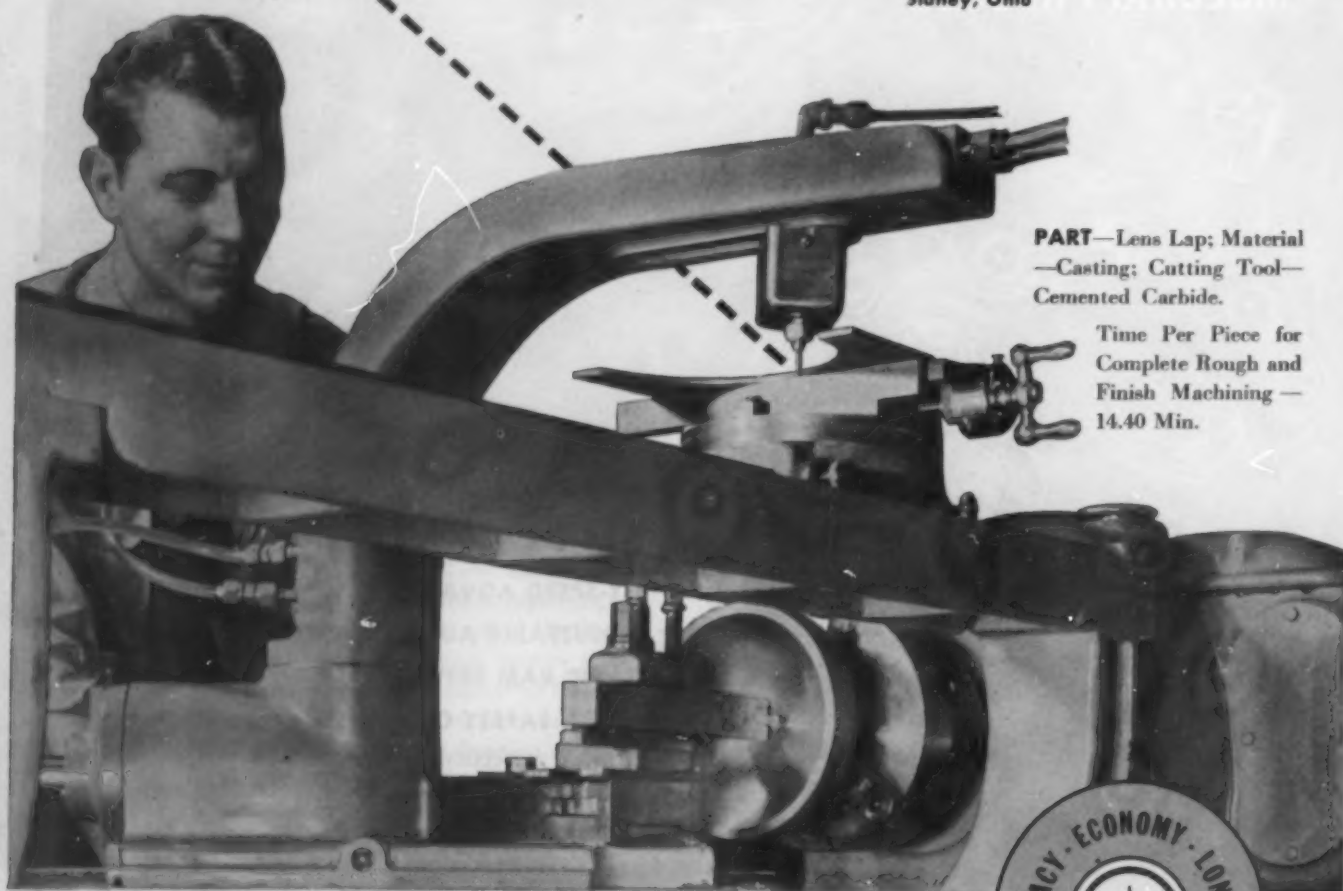
With this new lathe attachment you can handle such work faster, for lower cost—and *more accurately*—because the cutting tool motion is stepless. Finish is better, tolerances are closer; the slightest change in template shape is instantly translated into slide feed.

On jobs where accuracy is all-important, this ability to follow contours closely pays off in dollars saved—by increased production, by closer tolerances, by fewer rejects. That's why the Air-Tracer was selected for the lens lap job illustrated; the final lens can be no more accurate than the machine that makes the lap. And the machine's accuracy isn't subject to human errors, either—the Air-Tracer's operation is continuous and automatic.

Whether you're boring or turning contours; machining tapers, step shafts or ordinary production lathe jobs, the Monarch Air-Tracer can save you time and money. Like more details? Ask for bulletin 2601.

THE MONARCH MACHINE TOOL COMPANY

Sidney, Ohio



PART—Lens Lap; Material—Casting; Cutting Tool—Cemented Carbide.

Time Per Piece for Complete Rough and Finish Machining — 14.40 Min.

FOR SPEED, ACCURACY AND FINISH, THE MONARCH AIR-TRACER*

1. Stepless cutting-tool motion provides a superior continuous finish.
2. Setup times averaging five to ten minutes permit profitable use for a wide variety of small-lot production jobs.
3. Automatic yet versatile operation results in economical, accurate high production.

*Available exclusively on the new Monarch Lathes.



Monarch
TURNING MACHINES

BAKER *plasticizers*



from TROPIC HEAT

are unexcelled for
retained FLEXIBILITY

to ARCTIC COLD



The BAKER CASTOR OIL COMPANY *Established 1857*

20 Broadway, New York, N. Y.

Chicago, Illinois

Los Angeles, California



*They Don't Get Away From
Nylon Snells and Landing Nets*

BONDED WITH *Penacolite* *

RESORCIN ADHESIVES

An angry fish fighting for his life severely tests the strength of the equipment used to catch him. But sudden jerks, long sustained pulls and ferocious last struggles are easily defeated by nylon snells and landing nets bonded with Penacolite adhesives.

Penacolite adhesives are unaffected by immersion in fresh or salt water. They are completely resistant to molds, fungi, acids and organic solvents and are impervious to heat and moisture changes. Penacolite adhesives are strong and resilient, with extremely high shear strength.

Penacolite adhesives are ideal from the production viewpoint, too. Application is simply by mixing and spreading on, an operation which can be successfully performed by the least skilled worker. Cures can be obtained within a few hours at room temperature (75°F.), and moderate heat hastens them substantially.

There may be a Penacolite adhesive to improve your product. If you will give full details of uses, materials and production techniques we will be able to recommend or compound the specific Penacolite adhesive you need. Write us today.

* Reg. U.S. Pat. Off.

Pennsylvania Coal Products Dept.
KOPPERS COMPANY, INC.
PITTSBURGH 19, PA.



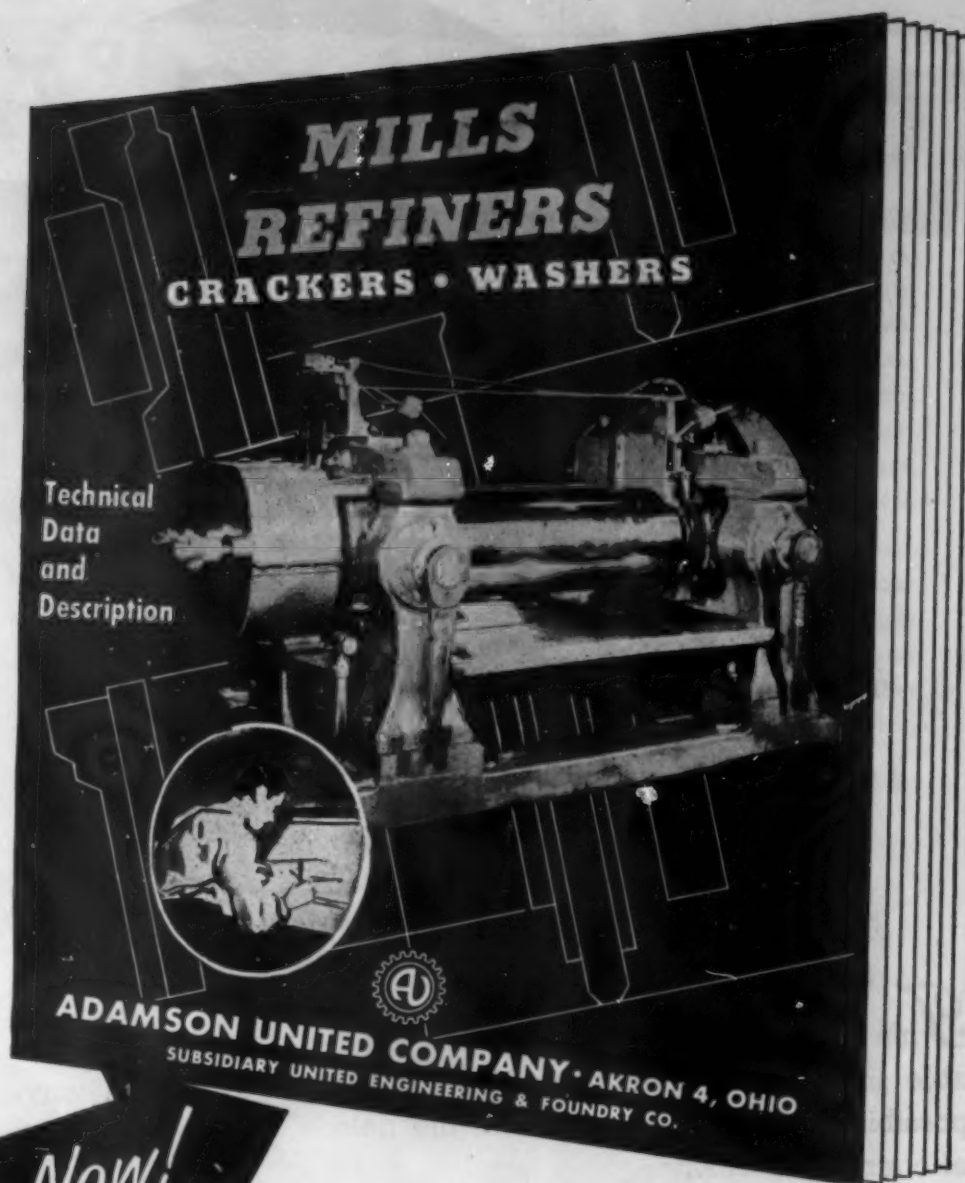
Your

 copy of

 this booklet

 is

 ready



Write for it Now!

ADAMSON UNITED PRODUCTS

- Mills
- Refiners
- Crackers
- Washers
- Rubber Sheeting and Coaling Calenders
- Plastic Film Calenders
- Calender Wind-ups
- Calender Cooling Rolls
- Complete Calender Accessory Equipment
- Large Molds
- Pot Heaters
- Vulcanizers
- Autoclaves
- Hydraulic Presses
- Multi-Platen Presses
- Automatic Curing Presses
- Belt Curing Presses
- Compression Molding Presses
- Plywood Presses
- Auxilliary Equipment



It illustrates and describes a wide range of modern Mills, Refiners, Crackers and Washers we have designed and built for some of the world's largest manufacturers and processors of rubber and plastics. The text is carefully compiled information you will want to keep in your files for reference. Designs of the various units illustrated are immediately available for reproduction or revision to suit your particular requirements. A request for a copy involves no obligation.

We invite your inquiries concerning special machinery for new or unusual applications or processes. Our engineers are available for consultation at all times.

ADAMSON UNITED COMPANY

AKRON, OHIO

In the New York Area address inquiries to

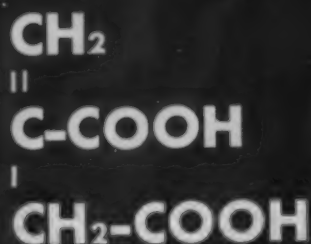
441 Lexington Ave., New York City

In the Chicago Area address inquiries to

140 S. Clark St., Chicago, Illinois

Subsidiary of United Engineering and Foundry Company

ITACONIC ACID



Molecular Weight . 130.10
Appearance . . . White, crystalline, solid
Melting Point . . . 167-168°C.
Solubility in Water . At 20°C. a saturated solution contains 7.6 grams of Itaconic Acid per 100 grams of solution.

*T*his unsaturated dibasic acid, now available in research quantities, offers many possibilities as a raw material in the field of chemical industry.

It can be used as a raw material in the preparation of resins of various types.

Its esters can be polymerized to yield colorless, transparent plastics of varying characteristics, depending on the alcohol with which the acid is combined. They can also be co-polymerized with other monomers, opening a wide range of possibilities.

Its structure indicates that it might prove a useful raw material for the preparation of

wetting agents.

It can be converted to citraconic or mesaconic acid and forms an anhydride.

Reduction yields methyl succinic acid which, in turn offers other possibilities as a raw material.

Itaconic Acid is not yet being prepared in commercial quantities, but limited amounts are available for laboratory research.

For samples and further information, please inquire of Chas. Pfizer & Co., Inc., 81 Maiden Lane, New York 7, N. Y.; 444 West Grand Ave., Chicago 10, Ill.; 605 Third St., San Francisco 7, Calif.

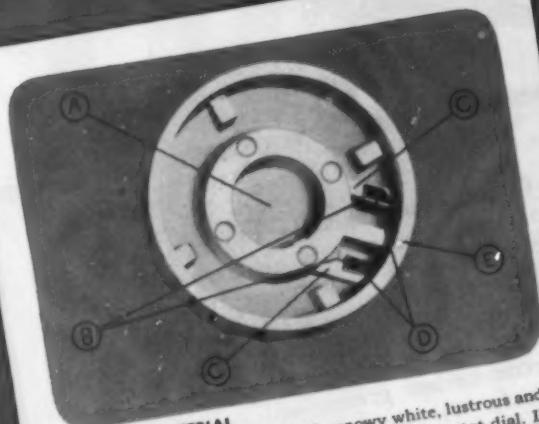
PFIZER

Manufacturing Chemists Since 1849



for plastic parts ...it's **AICO**

with the ROBERTSHAW THERMOSTAT CO.



MOLDING MATERIAL
Thermosetting urea compound—snowy white, lustrous and economical—was selected for this oven thermostat dial. It is resistant to household cleaning agents and the heat encountered on the job it must do.

MOLDING METHOD
These dials are compression molded in twenty cavity molds. Daily production is about 5,000 pieces. This high rate of production, made possible by the use of multi-cavity molds in modern presses, assures economical production.

MOLD DESIGN
The mold for these dials is highly polished to produce parts that require no buffing. The $\frac{3}{8}$ " hole with spline (A) must be kept to close tolerances to afford a simple, non-slipping assembly. Slots (B) and inside shoulders (C) make placement of the decorative metal strip (D) a quick, inexpensive operation. Graduations and signature are molded in and filled with contrasting paint for easy reading. Black paint was used for all markings except the "off" position (E) which is red.



SINCE 1935, the production of knobs and dials used on the famous Robertshaw line of thermostats has been entrusted to AICO. For more than twelve years, Robertshaw's correspondence concerning every phase of plastics parts procurement has been sent to one address . . . all of their problems have been our problems. The added quality of understanding, accumulated through the years, helps us to continue to serve them well.

The advantages of our complete facilities and modern methods can simplify your plastics problems. Our 30 years of precision molding with all materials and methods has given us experience that makes the best solution almost a habit.

AMERICAN INSULATOR CORPORATION

New Freedom, Pennsylvania

OFFICES: Cleveland—Detroit
— New York — Philadelphia

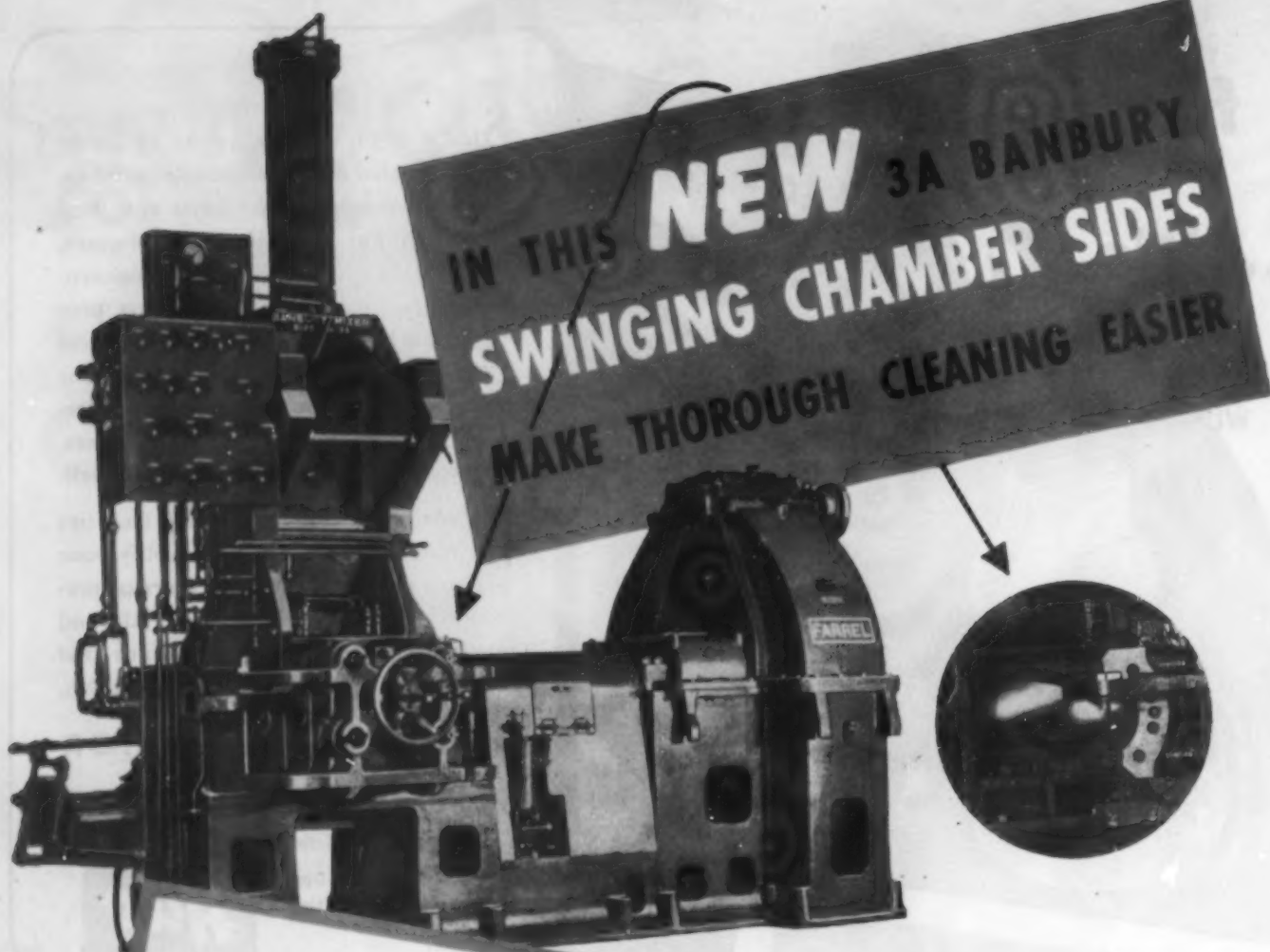


for over 30 Years



The new Portfolio of Aico Plastics Applications contains 28 actual cases showing a wide variety of practical and profitable applications of many molded plastics. Write for your free copy today.

MANY THINGS ARE BETTER BECAUSE OF PLASTICS
AUGUST • 1947 83



In this new 3A Banbury Mixer, chamber sides that swing open horizontally give convenient access to the interior to make thorough cleaning easier. This is a decided advantage in preventing contamination of a batch from a preceding one when color or type of stock is changed. Designed especially for processing plastics, this new 3A is ruggedly built for heavy duty service and will also handle rubber and synthetics.

Another important feature of this new 3A is the "Uni-Drive," which provides the heaviest torque loads, increases service life and reduces maintenance of the gearing and other elements. All gears are removed from the Banbury and enclosed in a separate housing, where, with the bearings, they are automatically lubricated. Smooth-operating universals connect the gears with the rotors.

Other features include: (1) Step-up type closures of the bottom discharge door to prevent leakage of powders; (2) Shields to prevent oil or tailings from dust stops dropping on discharge door and being carried into the chamber; (3) extended neck to accommodate greater volume of bulky material; (4) circulation of temperature-controlling fluid in throat as well as in chamber sides and rotors; (5) optional chrome-plating of interior surfaces.

We shall be glad to send you full details of this new Banbury on request. No obligation, of course.

FARREL-BIRMINGHAM COMPANY, INC.
ANSONIA, CONN.

Plants: Ansonia, and Derby, Conn., Buffalo, N. Y.
Sales Offices: Ansonia, Buffalo, New York, Pittsburgh,
Chicago, Akron, Boston, Los Angeles, Tulsa, Houston.

Farrel-Birmingham

FB-406



HEYDEN chemicals serve the nation's industries

PLASTICS • RESINS

Performance and appearance, the keynotes of product excellence, are enhanced when you use dependable chemicals by HEYDEN.

FORMALDEHYDE — Formaldehyde Solution U. S. P. — High in purity and uniformity — Low acid and metals content.

CONTAINERS: Tank cars, tank trucks (New York metropolitan area only), drums, barrels, kegs, carboys, and bottles.

PARAFORMALDEHYDE — Powder or granular.

CONTAINERS: 25-lb. and 100-lb. fiber drums.

PENTEK® — Pentaerythritol Technical — For mar-resistant coating compositions of alkyd, urea-formaldehyde, and modified phenolic resins. PENTEK finds valuable application in plasticizers and emulsifying agents.

CONTAINERS: 75-lb. multi-wall paper bags.

HEXAMETHYLENETETRAMINE — Acts as a flux in the molding powder; valuable as a methylenating agent to effect the final hardening; liberates ammonia, an active catalyst, and shortens the curing time.

CONTAINERS: U.S.P. and Technical Grades, 100-lb. fiber drums.

LIGNOCOL® — A standardized antioxidant and anti-skinning agent for paints, varnishes, lacquers, printing inks, and putties . . . prevents skinning without increasing the drying time.

CONTAINERS: 450-lb. stainless steel drums; 50-lb. boxed tin cans.

Technical literature will be sent on request.



HEYDEN CHEMICAL CORPORATION
393 SEVENTH AVENUE, NEW YORK 1, N. Y.

CHICAGO OFFICE, 20 North Wacker Drive

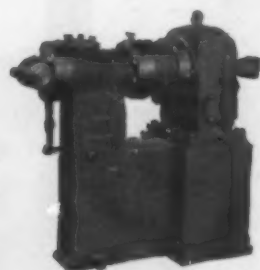
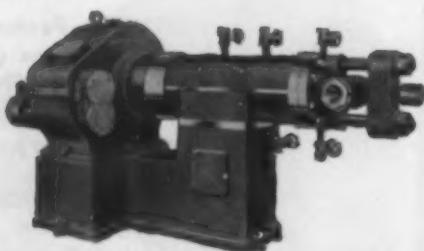
PHILADELPHIA OFFICE, 1700 Walnut Street

Benzaldehyde • Benzoates • Benzoic Acid • Benzyl Chloride
Bromides • Chlorinated Aromatics • Medicinal Creosotes
Formates • Formaldehyde • Formic Acid • Glycerophos-
phates • Medicinal Guaiacols • Hexamethylenetetramine
M.D.A. • Paraformaldehyde • Parahydroxybenzoates
Penicillin • Pentaerythritols • Salicylates



Almost every day we learn of new uses for N E Extruders—Mixing Mills and Hydraulic Presses. Things we thought impossible a few years ago are ordinary practice today. We are as old as the rubber industry and as new as the newest plastic materials. N E — Tubers — Extruders — Strainers — Masticators—Grinders or whatever you choose to call them are processing everything from vegetables to hush hush explosives. The principle is the same, it's the speed, pressure and heat that makes the difference. It will pay you to call in N E engineers for they have learned that almost nothing is impossible.

PLASTIC STRAINERS and EXTRUDERS to SPECIFICATION



LABORATORY and PRODUCTION MILLS

The N E line of Mixing Mills offers a broad selection of equipment. We are able to assume full responsibility for we operate 3 complete steel casting foundries and modern machine shops. From the smallest of laboratory mills to the largest of production mills, National Erie engineers can help you in your material processing work.



HYDRAULIC PRESSES TO SPECIFICATION



Write for Complete Catalog



NATIONAL ERIE CORPORATION

ERIE, PENNSYLVANIA • U. S. A.





"This advertising message, appearing in 4-color cover position in NEWSWEEK, BUSINESS WEEK and U. S. NEWS, is developing business for Monsanto Lustron molders and fabricators."

SAVED!

6 PRODUCTION STEPS

WITH

Lustron

A MONSANTO PLASTIC

CRISPER

When you produce the express way with Monsanto Lustron for your material there are no "local stops."

One molding does it all:

NO blanking

NO stamping

NO punching

NO machining

NO enameling

NO baking

Moreover, Lustron Monsanto's polystyrene molds readily in the fastest mass production techniques, all waste is salvageable at full value, low cost per pound plus light weight gives more items per material dollar. Monsanto Lustron comes in a rainbow range of colors, clear and opaque, it offers low temperature strength, high dimensional stability, excellent electrical qualities, freedom from taste and odor, and excellent resistance to alkalis, acids and water.

Let Monsanto plastics engineers show you the Monsanto Lustron way to put new performance into your product, get more profits out. Write direct:

MONSANTO CHEMICAL COMPANY,
Plastics Division, Springfield 2, Mass.
In Canada, Monsanto (Canada) Ltd.,
Montreal.

Lustron: Reg. U. S. Pat. Off.

MONSANTO

CHEMICALS AND PLASTICS

The broad and versatile family of Monsanto Plastics includes: Lustron[®] polystyrenes • Cerex[®] heat resistant thermoplastics • Vinyls • Nitron[®] cellulose nitrates • Fibestos[®] cellulose acetates • Thalid[®] resin • Resinox[®] phenolics • Resimene[®] melamines • Forms in which they are supplied include: Sheets • Rods • Tubes • Molding Compounds • Industrial Resins • Coating Compounds • Continuous Films • Vuepak[®] rigid, transparent packaging materials. Saflex[®] safety glass interlayers.

*Reg. U. S. Pat. Off.

SERVING INDUSTRY . . . WHICH SERVES MANKIND

AUGUST • 1947

87

PLASTICIZERS for the VINYLs

Films, cloth, paper and metal coatings . . . Molded and extruded elastomers

EMERY manufactures several types of plasticizers, some available in sizeable amounts, others in the pilot plant stage will be announced soon. Meanwhile, we invite inquiries on esters of azelaic and pelargonic acids and special Fatty Acids such as oleic, stearic and pelargonic, and others for the production of alkyl resins.

"Plastolein" X-55

• Diethylene glycol dipelargonate, "Plastolein" X-55, is immediately available in commercial quantities. Compatible with all of the vinyls, X-55 shows exceptional low-temperature flexibility, good moisture resistance and working properties.

"Plastolein" X-55 is recommended also for plasticizing nitro-cellulose, ethyl cellulose, cellulose acetate-butyrate, methyl methacrylate, etc.

"Plastolein" X-508

• This plasticizer, dihexyl azelate, is an extremely light-colored, low-viscosity liquid which makes very transparent, clear films characterized by excellent low-temperature performance with a low modulus of elasticity and a high tear strength. Especially recommended for Organosols and Platisols.

EMERY
INDUSTRIES, INC.

CAREW TOWER • CINCINNATI 3, OHIO

PLASTICIZERS

STEARIC ACID • OLEIC ACID • ANIMAL AND VEGETABLE FATTY ACIDS • TWITCHELL PRODUCTS • PLASTICIZERS

Plastic monofilaments are on their way

This is the first of three articles on polycynglidene chloride.

The article that follows will cover its extrusion and molding

AMONG THE most versatile of all the plastics families is the vinylidene group. There are very few jobs applicable to plastics that some member of this family won't attempt to do. Claiming the distinction of being among the most ubiquitous of all is polyvinylidene chloride.

Sire and dam are ethylene and chlorine by those prolific sires of chemical offspring, petroleum and salt. Ethylene is produced from petroleum by pyrolysis. Chlorine, which is extracted by an electrolysis of brine, is combined with ethylene to form trichlorethane, which is then converted into vinylidene chloride and polymerized. The colt born from this union was subjected to an injection of vinyl chloride in his blood stream, nominated for the *Plastics Derby* by Dow Chemical Co. in 1939 and christened Saran.

He is a stylish and rugged colt abounding in high color and toughness, and more immune from damage than most other members of his family. But with all his good qualities, Saran is a pixie-like colt who sometimes requires careful handling to keep him on the track. He is sound enough to be bathed with immunity in such strong chemicals as hydrochloric acid if his owner wishes, but he goes to pieces if the temperature gets a bit too high during his work-outs; he fusses considerably when asked to "stick" close to others and is temperamental as a prima donna when emerging from the starter's gate in the

Monofilament Stakes event, but once he's on the way under proper handling he can, with unbelievable versatility, win the long drudging races that require hard, consistent, constant pounding such as the *Spinning Bucket Handicap* or he can contend for leadership in the stylish, snappy, colorful *Seal Cover Special* sprint.

Quite a colt right now and he is growing fast. He is destined for great accomplishment.

Uses present and future

Polyvinylidene chloride is now coming to market in sizeable quantities after being held back for several years because of lack of production capacity and a wartime emergency that channeled most of the avail-

able material into insect screening for tropical service. Production has doubled six times since 1941 and is now adequate to meet present demand with further expansion underway.

It can be used for extrusion, injection or compression molding, monofilaments, multifilaments film or latex. There are said to be several thousand different end products already derived from this material. This story cannot begin to cover all the different types—sufficient to say that there are enough to drive a reporter frantic in attempting to run down all the leads suggested when studying the subject.

From fine fibers to heavy-duty extruded pipe

Saran is used to describe those vinylidene chloride containing polymers and copolymers manufactured by the Dow Chemical Co., Midland, Mich. These copolymers are supplied to other companies who process and merchandise it under various trade names but, for the sake of clarity and brevity, this article will use the word Saran to describe a basic material even though it is generally recognized as a trademark name applied to one company's product. Companies processing or using Saran and who merchandise it under other names are: National Plastic Products Co., Odenton Md., "Saran by National"; Chicopee Mfg. Corp., 47 Worth St., New York City, "Lumite"; Firestone Industrial Products Co., Akron 17, Ohio, "Velon"; Visking Corp., 6733 W. 65th St., Chicago, Ill., "Viskord"; Concordia-Gallia Corp., 1400 Broadway, New York City, "Cogon"; Elmer E. Mills Corp., 153 W. Huron St., Chicago 10, Ill., "Mills Plastic."



DRUM PLATE, COURTESY THE DOW CHEMICAL CO.

1—One of the most outstanding characteristics of polyvinylidene chloride is brilliant color. Original strong colors are now being supplemented by softer or pastel shades

and tubing, small molded vials and ladles to electroplating masks, colorful monofilaments for slip seat covers to moisture-proof wrapping films, Saran is serving in such diversified industries as footwear; petroleum, chemical and pharmaceutical; textile and packaging.

As a war weapon its uses ranged from insect screen to aircraft tubing to a braid for electric wire covering to rope for torpedo nets. In industry it serves in such heavy duty applications as for spinning buckets, tank lining, pipe and filter cloth. In the household it is to be found in furniture, millinery, shoes, food packaging. A full list of products would fill several pages.

There are many other uses, now in the experimental stage, that hold promise of wide and sound popularity. A lady's gown made of Saran fabric plus rayon and acetate has been exhibited at the Plastics Expositions but up until now little if any of this type product has come to market. It is believed that at the present stage

of development the filament is still too stiff for satisfactory use as a dress material or for draperies of the type used in homes, although it has been suggested as satisfactory for draperies in institutional or commercial applications. Multifilaments which are really monofilaments twisted into a single cable or cord have been much talked about but these are still in the development stage. Anything the public has seen in fabrics woven of polyvinylidene chloride multifilaments are simply an advance showing of what is hoped will some day become a commercial application.

The day may not be far away when a much smaller monofilament is successfully extruded and woven. At present the smallest size for commercial application is about 4 or 5 mils (0.004 to 0.005 in.) but a much smaller size from which even such sheer material as stockings may be woven is often talked about in the trade. This possible development should in no sense

be considered in the same category as multifilaments of this material which have already been mentioned.

Outstanding qualities

The strong points for Saran are, particularly, chemical and water resistance, great strength and brilliant color. It is practically unaffected by chemicals and acids, soap, salt solutions, solvents except some less common oxygen bearing compounds and most alkalies, with the exception of concentrated ammonium hydroxide.

There is some difference of opinion about the effect of sulphuric acid, nitric acid and chlorine. Some authorities insist that effect of these chemicals on polyvinylidene chloride is nil for all practical purposes but there are users who claim that some discoloration and a slight change in mechanical properties will occur from heavy concentration of these acids over long periods of contact and that a more than 10 percent concentration of chlorine will react to some extent on polyvinylidene chloride. Resistance to chemicals or solvents decreases with a rise in temperature to an upper limit around 170° F. But, by and large, there are few if any readily available materials that can match Saran for general all-around chemical resistance. This characteristic alone makes it a valuable material for use in chemical, petroleum, paper and textile plants.

Saran has an extremely low water absorption and vapor transmission rate. In the materials molded and extruded from Saran (including monofilament), the rate is less than 0.1 percent after 24 hr. at room temperature. And there is no accompanying shrinkage or elongation. Nor is the tenacity or extensibility of the material affected by moisture. Unaffected by salt water, Saran is particularly adaptable for marine uses.

In addition to its chemical resistance Saran is unaffected by mildew, rot or mold. It is practically stainproof and persistently refuses to be associated with such contaminating agents as gum, lipstick, blood, ink, fruit juices and the like. The material can usually be cleaned with soap and water but even stronger cleaning compounds are not harmful.

The strength and toughness of differently processed vinylidene chloride plastics vary considerably. Molded, the tensile strength is from 4000 to 8000 p.s.i. But when the material is extruded and oriented, experimental filaments of approximately 1 mil diameter have shown tensile strengths up to 100,000 p.s.i. while the usual filaments of from 8 to 20 mils develop strengths of from 30,000 to 50,000 p.s.i. Extruded tubing when properly processed is frequently used for compressed air lines because it stands up firmly against vibration.

Problems of polyvinylidene chloride

Like most other plastics, polyvinylidene chloride has disadvantages that prevent it from becoming an all-purpose material. One is economic. The colored resin or powder at around 40 cents a lb. is in the range of moderately priced plastics. It is generally more difficult to process than other materials. The difference between its decomposition temperature and

processing temperature is critical; however, under proper conditions it is adequate. Considerable care and special equipment are often needed for controlling the heat applications. Because the iron which is present in the metals normally employed in the construction of heating cylinders catalyzes or speeds the heat decomposition of the polymer at temperatures above approximately 200° F., it is essential that all those portions of the heating cylinder with which the material comes in contact at molding temperatures be of non-ferrous metals. The only metals or alloys recommended for this use are Hastelloy "A," Hastelloy "B," Stellite 19, nickel, z-nickel and magnesium.

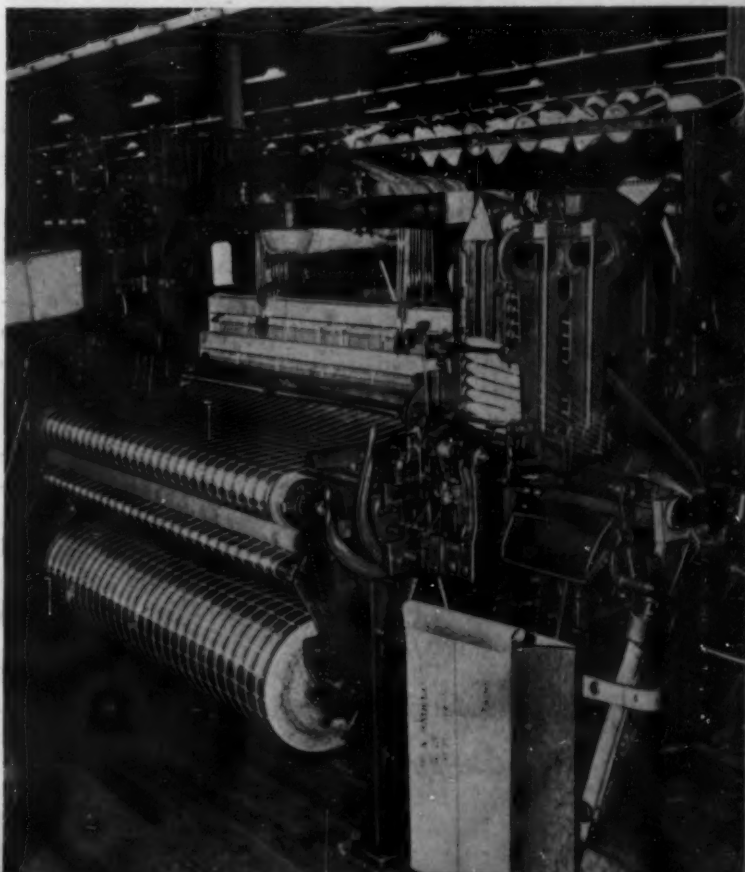
Another problem is difficulty involved in obtaining adhesion to other materials. Many companies are working on this difficulty and some claim to have overcome it, but Dow Chemical Co. officials maintain that they are still looking for better adhesives. One particular user asserts that the most successful adhesives he has found are those containing rubber, but he is not completely satisfied with the results.

Color—both pride and problem

Both pride and problem also exist in one of the Saran monofilament industry's brightest characteristics—color. Faced with the charge of fading even though it will withstand sunlight and weathering better than most textiles, the industry has been forced to battle

2—This worsted-type loom is weaving plaid pattern with a 60-40 construction. Finished polyvinylidene chloride fabric on the bottom roll of this machine is 54 in. wide. The tension roll is in the middle; take-up roll on top. The cloth begins just at left of upper clutch handle which appears almost at the center of this illustration

PHOTOS 2 THROUGH 4, COURTESY CHICOPPEE MFG. CORP.



furiously to overcome this artificial prejudice. Probably because of Saran's adaptability for outdoor use, the demand for color that would not lose its luster led to complaints of fading that merchandisers would not think of raising against other fabric upholstery. They ask for a Saran color that will stand 200 hr. of a Fade-ometer test for furniture and 100 hr. for automotive, yet they can expect only from 40 to 80 hr. in textiles.

A fairly new test method devised by color chemists

ance with the procedure set up by American Association of Textile Chemists and Colorists. This system allows company to furnish color ratings on individual colors.

Two methods are used to determine proper color rating—standard sun test and artificial light test. For the sun test, a sun exposure cabinet is used with specimens inclined due south at a 45° angle from the horizontal. Exposures are made between 9 a.m. and 3 p.m. on sunny days at an outdoor Florida station. The hours of exposure for determining fastness to light by comparison with the standard dyeings are:

Standard	L1	L2	L3	L4	L5	L6	L7	L8
Hours	3	6	12	24	48	96	192	384

For the artificial light test, the FDA Fade-ometer, carbon arc fading lamp is used. Specimens rotate about a carbon arc inclosed in Pyrex glass to insure uniformity of exposure at a distance of 10 inches. The hours of exposure for determining fastness to light by comparison with the standard dyeings are:

Standard	L2	L3	L4	L5	L6	L7	L8
Hours	5	10	20	40	80	160	320

The first answer to color complaints was to furnish bright, intense colors because more pigment could then be incorporated in the polymer. That plan boomeranged when the cry came back that the colors were too loud. For the past two years all parties interested have been striving to produce softer or pastel colors and late samples indicate success. But whenever the color is lightened the problem of fading becomes more intense, for there is then less color in the material, in fact less than $\frac{1}{100}$ percent. The same problem is inherent in color fading in any plastic or textile.

Other color difficulties have been the shortage of organic pigments, (only kind usable with polyvinylidene chloride) and the fact that different Saran formulations react differently to the same pigment. A pigment that may be *fast* in a formulation for tape is not necessarily *fast* in a monofilament due to extrusion difficulties. Developers have found that color fastness can be improved by varying the formulation according to its intended end use. The Dow Chemical Co. recommends that customers consult with them concerning the type of material they want on the theory that color considerations may be involved in making up the raw material. The company points out that a clear color or transparent monofilament has the greatest resistance to light in comparison to opaques which contain white and colored pigment. However, a new maroon opaque has withstood a better than 60 hr. Fade-ometer test or L7 rating. Weavers are getting good effects by mixing clear and opaque filaments in the pattern design, thus presenting a more varied color scheme.

The number of standard colors furnished by the various companies has grown to great proportions from the original 20 that were first offered by the Dow Chemical Co., and from these standards almost any

3—Polyvinylidene chloride screen, which got its start during the war, meets all requirements usually desired by consumers of insect screening. These desirable characteristics are: durability, no rusting or corrosion, no need for painting, non-staining and a good appearance

who were not satisfied with Fade-ometer tests—a system called Standard L ratings—was worked out whereby material to be tested is placed alongside a standard dye of the same color and with which it is compared after the weathering. In this test the ratings are from 0 (poor) to 8 (the best). Most of the Saran colors used rate between 6 and 8.

The National Plastic Products Co. uses a system of color stability ratings for Saran determined in accord-

desired shade can now be obtained. Chicopee Mfg. Corp. reports that on a recent order it duplicated 10 different shades for an exacting customer by using blends of its forty-odd standard colors from monofilaments extruded by National Plastic Products Co.

Screening bids for consumer favor

Best-known Saran adaptation for military use during the late war was insect screening in the tropics. The idea of using Saran filament in insect screening originated with Dow technical staff and shortly thereafter George Knox, former civilian chief of U. S. Navy's Bureau of Yards & Docks Section, got together with Jack Holman of the Chicopee Mfg. Corp., producers of surgical gauze and tobacco cloth. With this meeting the idea for providing a non-corrosive screen cloth to use in the tropics took root.

George Knox was seeking screen cloth to supplement metal, which was not only scarce but frequently rotted out in a few weeks due to the humidity in the Pacific combat areas. Jack Holman was seeking new products for his company and from experience with the new Saran knew that it could be woven for screen on the company's machines. He produced a tent that stood for months of observation between two wings of the Navy Department Building in Washington and was jestingly known as the Waves' dressing room. The results of the tent experiment are well known. Some 30,000,000 to 40,000,000 sq. ft. of Saran screen cloth was shipped to the Pacific area by the Navy.

Part of the demand for Saran screen since the war is due to the experience of sailors and marines who witnessed its performance in tropical humidity. Further demand was created by a lack of metal screens. The size of the market for metal screen cloth before the war averaged about 500,000,000 sq. ft. a year. Of this amount 400,000,000 was galvanized—the balance mostly copper or bronze.

At least 120,000,000 sq. ft. of Saran screen has been sold in the year ending June 1, 1947, according to a principal producer. Since about 5½ lb. of resin are required to produce monofilaments for 100 sq. ft. of screen, it can be seen that the consumption figure was in the neighborhood of 7,000,000 pounds.

Demand has fallen off in the last month. There are several reasons for this.

First: Demand for almost everything has fallen off and economists vary on the reason.

Second: The season for putting on window screens is over.

Third: Metal is more available.

Fourth: There is evidence of a consumer prejudice which has been fed by popular fallacies about plastics, many of which are due to faulty processing that can be corrected and others due to a feeling that plastics is a miracle material which should be indestructible even though hit by an atomic bomb.

Weavers have no intention of being put in the dog house by these developments. They feel that they have the most superior material ever brought out for

screen cloth. One of them spent well over \$125,000 for consumer advertising of his product last Spring. Another may have spent more. They are out to combat prejudice and prove authenticity of their claims. A survey made by this magazine of a number of jobbers of vinylidene chloride plastic screen cloth showed a majority of distributors sold on it but some of their customers prejudiced negatively so it would require several years to overcome their hesitancy.

First prejudice listed was that same old silly complaint about cigarettes burning holes in Saran screen. Now who in the world believes that civilized citizens are going around to their friends' homes burning holes in their screens? Wouldn't it be just as logical to use a pair of scissors, a knife or even a mechanical pencil to punch holes in a metal screen? If one is visited by a group of morons bent on melting holes in the screen it is a simple matter to replace the damaged screen and, once the replacement is made, it should last indefinitely unless those same friends return. Other types of screens frequently require replacement every few years. The point is, would a customer prefer a screen damaged by weather to one damaged by occasional mischievousness or accident?

Second prejudice was flimsiness. All weavers now use a 15 mil monofilament with 18 fibers lengthwise and 14 crosswise per inch. There was a time when 12 mil monofilament was used for some screen cloth but that size has been abandoned for the heavier filament which produces a sturdy material that has withstood the constant pounding of a 5-lb. ball dropped a distance of 1 ft. more than 70,000 times without any indication of sag.

Third prejudice lies in the claims of householders that plastics screen is too difficult to fasten to the frame without sagging. Producers of this screening claim it is a simple matter to attach it to the frame. It can be bought in various widths, from 24 to 48 in., with a selvage on each edge. Installation involves no more work than placing the proper width screen in the frame and tacking it along the selvage. The top and bottom are doubled back ½ in., drawn taut and tacked down. The screen will stay just as taut as drawn and the plastic is no more, if as difficult, to draw tight than metal. Only a pair of ordinary scissors is needed to cut the material—quite different from metal screen where tin shears are needed.

Fourth prejudice is said to be cost but plastic screen is now offered at a lower price than bronze and only slightly higher than galvanized metal.

A recent panel study by one of the housing magazines showed that from the consumer and user standpoints the prime characteristics of an insect screen were durability and performance; no rust or corrosion; no need for painting; appearance; no staining of house. Of all the commercially available and popularly priced insect screen cloth, only the polyvinylidene chloride screen cloth meets all these requirements.

Perhaps the most brutally frank statement concerning screen cloth was recently issued by the Ma-

terials Branch of U. S. Army's Engineer Board which after a thorough test of all possible materials for screening reported: "Of the screens tested, Saran and phenolic-coated glass cloth screening were the most durable. . . . If metal screening must be used, bronze screening, coated with two coats of paint, is recommended." Only the Saran type is commercially available of the two mentioned above and this the Army found more durable than metal for weathering, salt water, salt spray, heat, humidity and fungus. Oriented material from which screen or fabric is woven will withstand temperature well below 0° F. although unoriented Saran, such as is used in tubing or molding, tends to become brittle between 0 and 20° F.

Screen for inner shoe soles

Inner soles made of Saran filament were used by the Army to help prevent trench foot in the tropics and keep feet warmer in the Arctic regions. They consist of from three to five layers welded around the edge by heat and pressure or heat and pounding. The soles are made from 16-mesh material with 15-mil filaments though, in some cases, a finer mesh is used on the top and bottom to obtain a softer finish. Children's shoes with a similar sole were exhibited at the Society of Plastics Industry Show in Chicago last May. The inner soles are most practical for children's or men's

4—An appearance of depth is achieved in this honeycomb grille woven of polyvinylidene chloride monofilaments. Actual weave (here magnified 7 to 1) has depth of $\frac{3}{16}$ inch

heavy duty shoes, but generally speaking this outlet has not been widely exploited.

Woven fabric of polyvinylidene chloride

Although already in wide circulation as automotive seat slip covers, polyvinylidene chloride is still in its infancy. Many yards are in use and giving satisfactory service but developers expect a much greater market to develop when consumers become fully aware of its quality and the upholstery and furniture trade become more experienced in applying it.

This material is furnished for upholstery in several different forms—woven monofilaments of various weights and widths, tape or webbing of either woven monofilament, or solid film used for plaited type upholstery and rattan.

Woven monofilaments

The extruded monofilament that is used for polyvinylidene chloride fabric is generally 12, 10 or 8 mil diameter. Various types of looms are used in weaving. Hafner Associates, Inc.,¹ use the same machines employed in weaving upholstery, drapery and dress goods fabrics with reinforced creel pins, gears and frames, and an auxiliary heating process to render the yarn more pliable. Heating systems used by weavers are generally infrared or resistance type. The Lumite Division of Chicopee Mfg. Corp. uses both worsted and cotton type looms with simple alterations and with no heat. Any textile mill can, with only minor changes, switch from cotton, woolens or rayon to this synthetic textile. Herringbone, twill, broken twill, honeycomb weaves are most generally employed.

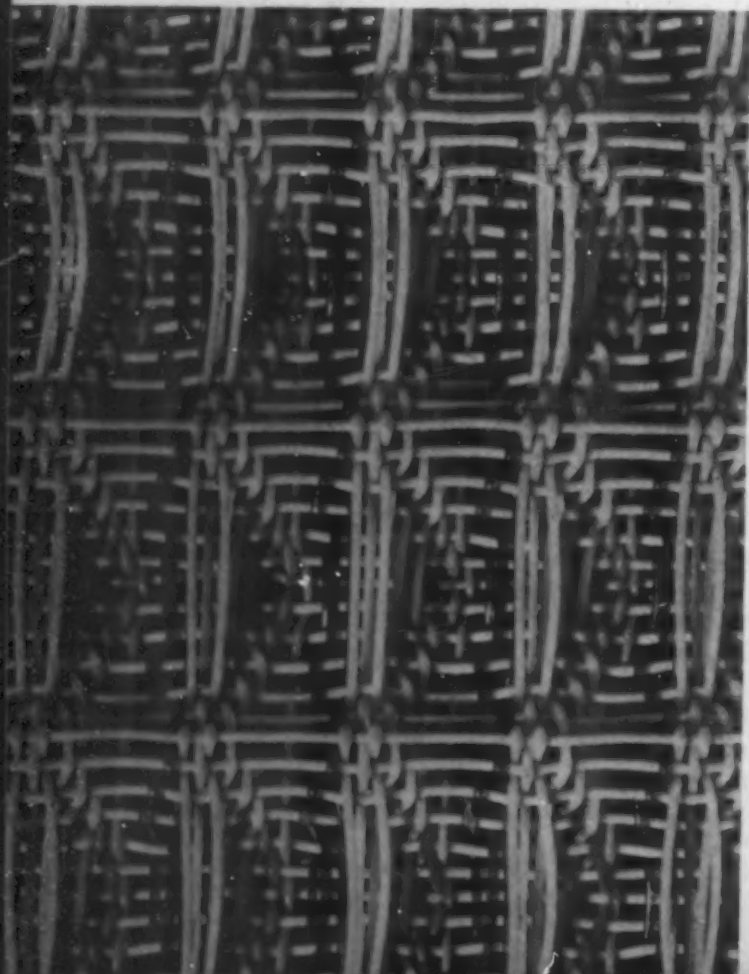
All such woven fabric is calendered, but by many different methods and depending upon the intended use of the end product. When a softer finish is desired, a finer filament with an open weave is designed so that the calendering process squeezes the material into a more compact mass with perhaps a better drape. Some weavers insist, however, that a stronger more durable fabric is constructed with a heavier, closer-woven filament that must be employed in such heavy-duty work as that generally associated with upholstery.

Calendering processes vary in amount of pressure used and the method for applying heat, which may be either steam or electric. The cylinders or drums of the calendering press may be iron or pressed husk—sometimes both—so that pressure may be iron to iron, iron to husk or husk to husk. Felt-covered rollers have also been tried experimentally.

Auto covers—Greatest merchandising effort to date for woven Saran fabric has been on auto slip seat covers. When polyvinylidene chloride is more plentiful and users have become acquainted with its natural adaptability for this market the industry believes there will be a consumer demand that station wagons, convertibles and other special types of cars have woven plastic as the original upholstery.

As a woven fabric Saran has some advantages over

¹ "Glamor, utility in plastic fabrics," MODERN PLASTICS 24, 106 (Feb. 1946).



solid-type upholstery because the interstices permit breathing, making auto seat covers cooler in summer, warmer in winter. Properly woven material facilitates movement of driver and passengers in and out of the seat. A twill weave, for example, facilitates the slide-in and resists sliding forward.

A great fuss was raised some months ago with complaints that Saran upholstery would break off the hair bristles on a lady's fur coat when she moved about on an automobile seat. It is hoped that the fallacy has by now been knocked into a cocked hat. Ladies have been sitting for years on paper fiber woven auto seat covers that will wear the fur off a lady's coat if the fur became entangled in the interstices. Fortunately few women have the heeby-jeebies so severely that they must be constantly moving back and forth across an auto seat, and the normal wear on the seat or back of an auto driver's clothes is no greater from Saran than from any other material. Furthermore, experience in weaving has resulted in the evolution of a more closely knit, less abrasive surface which should eliminate even the thought of losing a hair from a lady's coat.

An auto reupholsterer, referred to by dealers as one for whose work they had the highest regard, pointed to the polyvinylidene chloride material as his favorite of all the various upholstery types available. He has used it as a covering over seats to refurbish used cars and mentioned as desirable qualities, aside from color, elasticity and long life, the material's ease of handling. He can sew it on the same heavy-duty machine he uses for other materials with the same needle and same thread. Producers, however, recommend that nylon thread be used to avoid any possibility of abrasion and that Saran-type gimp or welting be used where the seams are fastened together. Cloth welting has a tendency to wear off and become frayed to give the cover an untidy appearance long before the woven fabric shows signs of wear.

Another property the upholsterer liked was non-cupping quality of woven polyvinylidene chloride. Some materials are slow to come back and, in time, a permanent depression appears in the seat where a driver sits. This undesirable quality should not appear in properly woven Saran-type materials. It has an elongation of 30 percent at the ultimate, but 95 percent is recoverable.

The ability to compete with other upholstery materials for initial cost is a handicap not yet overcome although producers feel that they have a much longer-lived material than textiles or paper fiber. Paper fiber has dominated the automotive slip cover field for years and has sold at as low a price as 50 cents a square yard. Saran processors do not expect to take over the entire market but they expect to make a big dent in it. At present paper fiber is high priced—has even been as high as vinyl chloride sheeting—but the day is coming when it will be back to normal and when that day does come, competing with it will prove to be quite difficult.



PHOTO, COURTESY FIRESTONE INDUSTRIAL PRODUCTS CO. AND HAFNER ASSOCIATES, INC.

5—Upholstery woven of polyvinylidene chloride monofilaments are specially successful in applications that call for heavy wear—as seat covering on commuter trains

At present this monofilament upholstery is running a little less than two to one above vinyl chloride coated material in cost and although the materials are not always in direct competition due to the type of car being covered, the situation demands that the woven type plastic must be devoted to applications where it is more desirable than leather-like upholstery. If a larger market is sought, price may have to come down. About 7 yd. of 36-in. wide material is needed to cover the seats of a car. Woven fabric requires about 1 lb. of filament per square yard of goods with an additional $\frac{1}{4}$ lb. of waste yarn such as short ends and clippings. Weavers declare that they have found no way to use this waste. Extruders of the monofilament can use their waste in formulations for other types of extrusion but successful extruders already have their price down to rock bottom considering the difficulties and niceties of their operation. Testimony to this effect can be ascertained by querying processors who have looked into and actually experimented in the intricacies of monofilament extrusion but have given it up because they could not compete pricewise with those already in the field. Weavers also contend that the cost of raw material for woven Saran is a considerably higher percentage of the total cost than in cotton textiles where the raw material cost is about $33\frac{1}{3}$ percent.

(Please turn to next page)



COLOR PLATE, COURTESY NATIONAL PLASTICS PRODUCTS CO. AND COLUMBIAN ROPE CO.

6—Polyvinylidene chloride rope is outstanding for strength, resistance to salt water—properties making it popular during war for torpedo nets. Though peacetime uses are not set, rope should prove popular where exposed to chemicals

From this it can be seen that the problem of reducing cost is a complex proposition even though the producers tacitly admit that larger-scale production of resin should some day result in lower prices of the raw material. Yet we have seen how plastic screen from this material is already in successful competition on a cost basis with metal and it may be that the woven filament's particular adaptabilities for upholstery will eliminate any necessity for competition with lower-cost goods.

Other upholstery uses—It should be remembered that there has been little chance to exploit Saran in the upholstery field due to a shortage of resin-making facilities. Auto slip seat covers were deliberately chosen as a promising field in which to start, but there has been enough development in furniture lines to indicate wide interest not only for interior and porch furniture, but for railroad and bus seating, office furniture, seats for auditoriums and theatres and for hospitals where its chemical resistance and refusal to support combustion should give it top consideration.

Radio and recording uses—As a grille for radio and recording cabinets woven monofilament has taken hold in a big way. A unique honeycomb or semi-honeycomb weave has been devised for this purpose to give the appearance of depth even though it is only $\frac{3}{16}$ in. thick. In one example each "cell" of the comb is 12 threads by 12 threads. There are 61 filaments the long way and 32 the short way (warp and woof) per inch. The advantage of this grille, the design of which is peculiarly fitted to the texture of polyvinylidene chloride monofilaments, is it permits better transmission of ultra-high and ultra-low volume on high fidelity units. There is less interference with the sound waves as they come through the honeycomb

grille, yet the inside of the speaker is completely hidden from view. This material is expected, eventually, to replace most grilles commonly made from tapestry or flock-covered metal. It requires no surface sizing which is said to interfere with character of tone.

Further advantages are color to match the cabinet, rigidity and long life. The same material may also be used decoratively as inserts over the false speaker, a piece which is frequently found on console sets.

Luggage and shoes—Woven Saran has also been tried as a luggage covering and uppers for women's shoes, but in both cases the adhesive problem has given trouble. Saran will stick to the flat part of a luggage case with ordinary rubber adhesives but for some reason pulls away from the rounded parts. Best results so far reported are from cut-back adhesive, a mixture of reclaimed rubber dissolved in toluene.

For high-style women's dress shoes it has many admirable qualities such as color, style and elasticity with the additional highly regarded feature of breathing so air may penetrate and promote foot comfort. But, so far no satisfactory adhesive has been found to fasten the material to the sole unless cotton fabric is woven into the ends of material which is then tucked in between the layers of sole leather so that the cotton may absorb the adhesive and help to form a bond. One large shoe manufacturer is reported to have a trick construction that will eliminate the adhesive problem but asserts he will not bring his shoes to market for a year or two or until the hub-bub over plastics misapplications in the shoe field has passed away.

Industrial uses—Another use for woven Saran in the less glamorous but heavy-duty commercial field is filter cloth, where it has proven its usefulness because of chemical resistance. For these applications an 8-mil filament is generally used with a fine weave such as 120 warp and 50 woof to the inch. A 90 and 50 combination is also common but almost any needed variation is possible. For comparative purposes, finer cotton textiles are generally woven with a warp and woof of 200-150. A similar application to filter cloth is woven screen cloth fabricated into a dipper for use in recovering items from strong acids with the open mesh permitting the liquid to drain back into the tank. Conveyor belts of woven filament are another heavy-duty item particularly applicable to Saran when chemical resistance and strength are needed.

Tape or braid

In addition to woven fabrics and textiles of piece-goods size there are other types of Saran adaptable to furniture. Best known is tape or braid, either solid or woven from monofilaments. It is used for seats and backs on chairs in plaited form—that is, woven over and under in single strands of from $1\frac{1}{2}$ to 6 in. wide. The woven type braid or webbing is also used as support under cushions in chairs, sofas.

Test data—Concordia-Gallia Corp., for one, is specializing in these narrow woven strips. In addition to flat tape they produce tubular tapes and variegated beadings to use as welting for upholstery, belts, handbags and trimmings. Their test data on a 2-in. web that is $3\frac{1}{2}$ in. long indicate a breaking strength of 593 lb. with elongation at break of 20 percent. Elongation at 150 lb. stress is 0.08 in. per in. since the piece increased in length from $3\frac{1}{2}$ to $3\frac{3}{4}$ inches. At 300 lb. the piece increased from $3\frac{1}{2}$ to $3\frac{7}{8}$ in. in length but on release returned immediately to $3\frac{9}{16}$ in. and came back quickly thereafter to the original $3\frac{1}{2}$ inches. A piece of similar size under a 300-lb. stress for 3 hr. elongated to 4 in., returning immediately on release to $3\frac{11}{16}$ in. and in 10 min. to $3\frac{9}{16}$ inches. From these tests it is easy to understand why users of woven webbing have little fear of complaints about "permanent set." Users of solid tape make comparatively the same claims.

Adhesion—Adhesion, specially with metal frames, presents a problem with tape upholstery though Concordia-Gallia Corp.'s technical staff asserts that electronic heat sealing may be accomplished using a film to prevent an air gap which might cause an arc flash. Bar sealing with a shaped die is claimed to be effective, but it is not always convenient to apply electronic heating to upholstery fastenings. Several companies claim they are producing satisfactory adhesives for this use that can be used for either dipping or spreading, but complaints from users continue to come in. When wood frames are used the strip ends may be nailed underneath the edges of the frame. An improvement of this method in the form of a clip-type fastener which permits quick fastening and change of fabric if desired in order to alter color schemes of the webbing has been devised by United-Carr Fastener Corp., who also have a different device for attachment of the webbing to metal frames.

Rattan

Still another upholstery material made from Saran is extruded rattan in varying widths of from $\frac{1}{16}$ to $\frac{1}{4}$ in. with a thickness ranging from 17 to 24 mils. It is generally backed with fabric and most common application is on hard cushions used in transportation where it has the advantage of being easily cleaned. The subways of New York City have been using it on experimental cars for five years and their satisfaction seems implied in their efforts to get more. Rumors circulate that an automotive company is interested in it for certain types of seat covers.

Chemical and salt resistant rope

Because of its strength and resistance to salt water Saran rope came into repute during the war as an ideal material from which to fabricate torpedo nets. Monofilaments of from 0.030 to 0.050 are used in its construction. One manufacturer reports that it will make a satisfactory, strong, abrasive-resistant rope with desirable chemical resistance, but that the po-

tential market is not yet apparent. He didn't say so, but it is apparent that the matter of relative cost and high quality must again be sold to the customer. Because the fibers are slippery the physical problem of making a splice hold is a deterrent, but extra tucks and the seizing of strand ends to each other to prevent slipping will generally take care of the trouble.

Plymouth Cordage Co.'s Saran rope is made with three strands, but the number and size of yarns differ from those in corresponding sizes of Manila rope. One pound of $\frac{3}{16}$ -in. Saran rope will make 68 ft.; $1\frac{1}{2}$ lb. will make $1\frac{1}{2}$ ft. of $1\frac{1}{4}$ -in. rope. Minimum breaking strength varies from 260 lb. for $\frac{3}{16}$ -in. rope to 12,000 lb. for $1\frac{1}{4}$ -in. rope.

When compared with Manila rope, the weight of Saran rope in corresponding sizes is from 35 to 60 percent greater. The minimum breaking strength of Saran is approximately 70 percent of the strength of Manila rope. According to Plymouth Cordage Co.'s literature it has a tendency to lose strength gradually at high temperatures, but can be recommended for use in temperatures up to about 170° F. and has been used satisfactorily in higher temperatures where full strength was not required. Exposure to weather, winter or summer, does not reduce its strength nor does alternate drying and wetting change its properties—wet strength is the same as dry strength and it does not rot. Under repeated loading this rope has a working stretch from three to four times greater than Manila rope. This characteristic makes it considerably more resistant to shock loading.

7—Polyvinylidene chloride in solid or woven form is appearing as tape or braid for use as seats and backs

PHOTO, COURTESY-CONCORDIA-GALLIA CORP.



Nine plastics improve

Plastics have been used in this new accordion both for what they can contribute to its appearance and to its better and longer performance

ALL PHOTOS, COURTESY RUDOLPH WURLITZER CO.

- | | |
|------------------------------------|--------------------------------------|
| 1. Nitrate base box | 10. Polyvinyl valve lift silencer |
| 2. Nitrate grille | 11. Modified styrene, acrylic insert |
| 3. Acetate back | 12. Acrylic strap adjustment wheel |
| 4. Laminated bridge cap, separator | 13. Acetate bass button |
| 5. Modified styrene action bridge | 14. Acrylic keys, styrene sharps |
| 6. Laminated reed block slide | 15. Modified styrene key slip |
| 7. Modified styrene key bed end | 16. Acetate feet for bass shell |
| 8. Modified styrene shift button | 17. Modified styrene grille trim |
| 9. Acrylic nameplate | 18. Phenolic bridge caps |



Acrylic treble keys, reinforced with cemented-in molded plastic inserts, are screwed onto aluminum bodies

Preheated nitrate sheet, 0.105 in. thick, is formed into bass box shell. Wood ring holds material at edges



new accordions

SELDOM has the versatility of plastics been more strikingly illustrated than in the new Wurlitzer Model 1030 accordion. In this handsome instrument, volume production of which is now shaping up in Wurlitzer's streamlined postwar accordion factory at De Kalb, Ill., plastics and light metals have replaced wood for many conventional usages. Final selection of materials was made in each instance to meet the specific service requirements.

The way in which the plastics industry can be used to give almost any desired property in a finished part is exemplified by the array of different plastic materials to be found in this new instrument. They are Plexene M, a new modified polystyrene molding powder; drawn Pyralin and Lumarith sheeting; injection molded Lucite, Plexiglas; injection molded Tenite I and II; polyvinyl tubing; flock-filled phenolic; Delecto linen-phenolic laminate and injection molded standard polystyrene.

Much of the pleasing exterior design of the instrument can be credited to the use of formed Pyralin for the bass box section and grille unit, formed Lumarith sheet for the back cover and Plexene M for the two key bed ends. The Plexene M and Plexiglas keys, Lucite three-dimensional name plate and white Tenite II bass buttons also share the credit for the beauty of the accordion. But beneath this gleaming plastic exterior are to be found more plastic applications with a purely functional role.

Taking the working parts of this new instrument (including chassis and interior pieces) one by one, there is, first of all, the molded key bed ends. The treble chassis, which supports the piano-like keyboard and is housed within the cloth-backed grille section, is of deep drawn magnesium. After aluminum arms have been riveted to this chassis, the modified polystyrene key bed ends, produced by Anfinson Plastics Molding Co., of

These plastics are vinyl, butyrate, acetate, nitrate resins, laminates, acrylic, phenolic, two polystyrenes

Aurora, Ill., are screwed to metal supporting brackets. Four $\frac{1}{8}$ -in. holes are drilled in these plastic parts to permit anchorage of the metal strap hook directly to the supporting metal structure.

The key bed ends are joined by another part of modified polystyrene, a straight black extruded piece, which forms the front of the keyboard section. This part, extruded by Sandee Mfg. Co., 5050 Foster Ave., Chicago, Ill., is cut to proper length by Wurlitzer.

The white (natural) key faces, supplied by Shaw Insulator Co., Irvington, N. J., are injection molded of Plexiglas because the application called for close color control, stiffness, age and color stability, dimensional stability and freedom from subsequent distortion. Black Plexene M is employed for the sharps and the sharp inserts to obtain these same properties at lower cost. These parts were also molded by Shaw Insulator Co. The key faces are screwed onto the aluminum key bodies at two points. All have cemented plastic inserts, the two-piece construction being employed to avoid "sinks" from this heavy mounting section.

Four molds are used on these accordion keys, including two 12-cavity combination molds for the natural (white) keys, one 36-cavity combination molds for white inserts and another 36-cavity mold for the sharp (black) inserts. Cementing of inserts into the key faces is handled by Wurlitzer. Fourteen separate molded items are used in the keyboard assembly.

Both the bass and the treble chassis house a number of vital plastic components. In the honeycomb-like reed block assembly on the bass side (a complex structure formed of glued wooden parts) are two reed block slides. On the treble side there are four slides. All control the flow of air into the reeds. These slides, consisting of strips of 0.035-in. linen Dilecto phenolic laminate,

A multiple drill press is used to drill button holes in bass boxes. A total of 120 such openings are needed

The grille is also formed from nitrate sheet, this time 0.090 in. thick. Mold was specially designed for job



are punched with rectangular openings which permit passage of air from the bellows. The slides for the bass are $\frac{5}{8}$ and $\frac{1}{2}$ in. thick; those for the treble are $\frac{1}{2}$ in. thick. The advantages of the plastic laminate slides as opposed to the customary sheet metal slides are: sufficient rigidity to resist distortion during repairs or adjustments, an exceptionally smooth surface which permits them to slide easily, moisture resistance and good wearing qualities. The phenolic laminate for this application is supplied by Taylor Fibre Co.

Another interesting functional use of plastics in the Model 1030 accordion is found in the harmony and fundamental action racks. There, Plexene M action bridges—two in the fundamental section and three in the harmony section—serve as guides for the dozens of metal action rods. The cut-to-length sections of rectangular extrusion comprising these pieces are supplied by Sandee Mfg. Co. in natural light amber color of the material. Wurlitzer mills each of the bridges with a series of slots of varying widths and depths, so that they line up accurately with the metal rods which pass through them. The milling machine on which they are fabricated cuts six of a kind at one time, and may be fitted with cutters of different size to produce the complete assortment of bridges.

The action bridges are secured into the assembly with screws which pass through drilled holes. The excellent machining properties of the modified polystyrene were an important consideration in its selection for these parts, since close tolerances must be maintained.

Yet another plastic—flock-filled phenolic—is employed for the caps which hold the action rods in place. Two of these caps, supplied by the Richardson Co. of Melrose Park, Ill., are used on the harmony and two on the fundamental.

Molded buttons and levers

Pistons of the bass action are capped by 120 white Tenite II buttons, injection molded by Anfinson Plastics Molding Co. A similar button is used on the air release valve. All the cored bass buttons are driven onto the tapered ends of the aluminum rods with an air cylinder, insuring a tight press fit. Short lengths of polyvinyl tubing supplied by William Brand & Co. of Chicago, Ill., are used as silencers. The resilience and durability of the vinyl suit it for this use.

The two self-indicating, organ-type treble shift controls or buttons are fabricated by Wurlitzer from a special section extruded in ivory Plexene M by Sandee Mfg. Co. Following the necessary drilling operations, assembly pins are driven directly into the plastic buttons to provide means for attachment to the instrument. The chrome plated, bar-type "push-in" bass shift is equipped with a transparent polystyrene shift-indicator window through which a signal indicating the shift setting may be seen. Part is milled to size and shape from rod by Mid-West Screw Co. of Rockford, Ill.

The two main parts of the accordion shell are of black Pyralin sheet material, purchased in 20 by 50-in. sheets, cut to proper shape and formed in special dies. Mate-

rial 0.105 in. thick is used in the bass assembly, while that in the grille unit is of 0.090 gage. The pre-cut sheets of material for both parts are preheated around 145° F., then quickly placed in molds before cooling can occur.

For drawing the bass shell, a male and female die assembly is employed with the wooden male plug mounted below a 10-in. air cylinder. The female die, made of Kirksite, has molded-in coils for the circulation of steam or water. After insertion of the preheated sheet of cellulose nitrate, the press is closed, drawing the material into the required contour. The complete heating and cooling cycle on this piece requires about 8 min., close temperature control being maintained to avoid overheating or cracking the material. Following its removal from the press, edges are trimmed and the bass button holes drilled with a multiple drill press.

A special die for grille

For the grille section, a specially designed mold actuated by a long hand lever, is used. Made by Wurlitzer, the die consists of hard maple with metal inserts which form the curved ribs of the grille. A book-type die, hinged at one edge, is required for this piece because proper forming of the cellulose nitrate sheet depends upon a rolling rather than a straight closing movement.

Finishing of the grille sections involves placing them in a wooden fixture and guiding them beneath a routing tool to cut out the 25 slots in the grille. Following routing and drilling operations, the grille and bass box units are trimmed to size, buffed, sanded and polished.

There is also another forming operation which incorporates an interesting metal inlaying technique developed by Wurlitzer under the direction of Erwin Osenberg, superintendent of the accordion plant. The part is a finish trim strip bordering the grille on three sides, which is formed from a Plexene M extrusion supplied by Sandee Mfg. Co. While the piece is being given the required "U" shape, a decorative leaf design, stamped from 0.010 chrome plated brass, is fused into surface.

This operation is accomplished by placing the strip in a jig which permits application of the required bending pressure and also concentrates sufficient pressure and heat on the decorative stamping to weld it flush into the face of the extrusion. Heat is supplied by a high frequency unit and cycle requires about 15 minutes.

The grille itself is backed with white grille cloth and fitted with a three-dimensional injection molded Lucite Wurlitzer nameplate. This identifying emblem is produced by Gits Molding Corp., 4600 Huron St., Chicago, Ill., through its Crystal Seal process.

Yet another exterior plastic part is a clear Lucite bass strap adjustment wheel. With a milled edge for easy turning and a molded brass insert serving as a bushing, it is injection molded by Rockford Molded Products, Inc., of Rockford, Ill. Finally, there are the bass shell feet, molded of Tenite.

Final assembly of the shell components takes place after internal operations have been completed. The complete shell includes a back section, currently formed of 0.075 Lumarith sheet.

5 advantages of acetate moth suffocator

A GAIN and again, with the introduction of each new vacuum cleaner, the suitability of plastics to this household equipment is reaffirmed. Perhaps the most recent application of plastic—in this case, cellulose acetate—to this field is the special attachment for killing moths and larvae which is a feature of the new vacuum cleaner put out by Lewyt Corp., 60 Broadway, Brooklyn, N. Y.

There are five reasons why Lumarith was selected for this particular part which is pictured at the right:

1. Light weight.
2. Transparency which permits the crystals to show.
3. Variety of color which makes it possible for the plastic to fit any color scheme.
4. Less expensive to make than similar metal piece.
5. Shatter resistance.

The molder responsible for this two-piece Lumarith part is Celluplastic Corp., 46 Ave. L, Newark 5, N. J. A 4-cavity combination mold is used and the cellulose acetate is supplied in a blue, specially compounded to meet the specifications of the vacuum manufacturer.

The design of this plastic moth-proofing attachment can best be appreciated from a brief description of the way it functions. When the Lewyt vacuum is wanted for demothing the cleaning hose is slipped from the opening in the side of the barrel-like cleaner and replaced by the blue cellulose acetate moth-proofing part filled with moth crystals. The vacuum is placed in the closet, its electric cord plugged into a nearby outlet and the door closed. Inside the plastic attachment rapidly swirling air sets moth crystals into dancing motion, disintegrates them, releasing powerful vapor which kills moths and larvae.

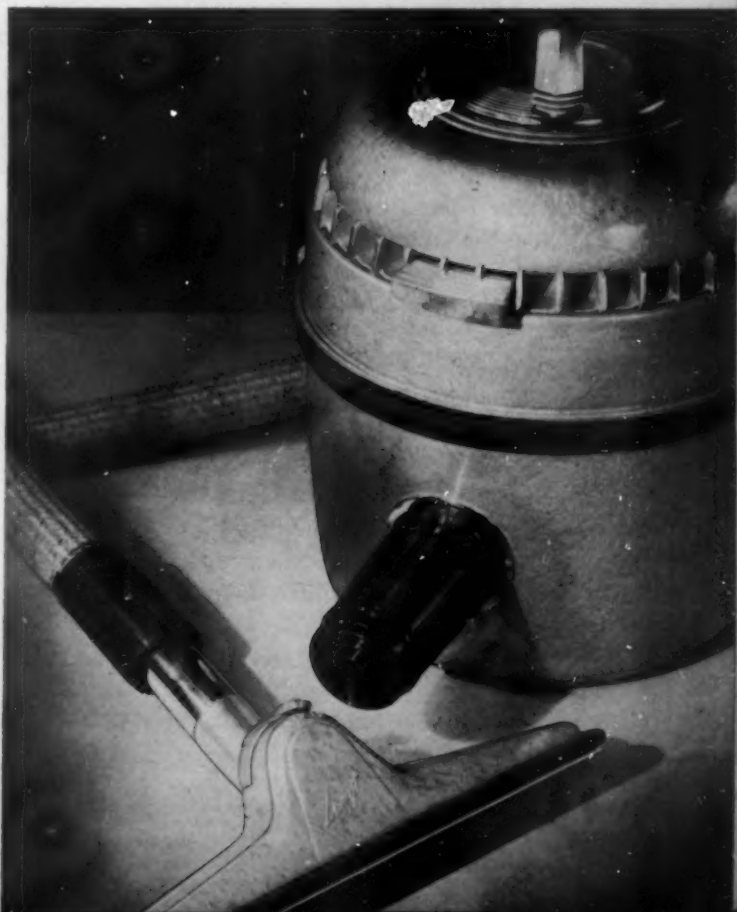
A number of metal fittings are assembled with the two-piece cellulose acetate attachment after molding. For example, wire screenings, of different mesh, are affixed to the body of the "snuffocator" at the end closest to the body of the vacuum and inside the cap of the attachment. Both screens are designed to prevent the escape of the moth crystals as they are agitated by air from the vacuum proper. Another metal part in the body of the attachment holds it firmly to the body of the cleaner yet makes detachment easy—a mere twist of the wrist.

The ribbing on the outside of the two parts of this cellulose acetate attachment serves a useful as well as a decorative purpose. One of the ribs on the body piece is a trifle longer than the other ribs and locks with a small cutout on the lid, preventing the lid from whirling around from the action of the air. In any other material this detail would have proved costly and time consuming. But in plastics the production of this latch was a simple matter.



Two complete 2-part cellulose acetate moth attachments are molded at each shot. Three metal fittings—two to hold in the moth crystals and one to prevent the fitting from becoming detached from vacuum—are added later

Advantages of plastic in vacuum fittings are: shatter resistance, light weight, transparency, color, low cost





To make this king-size glass replica, four-color printed vinyl sheet is rolled into a tube, the edges heat-sealed and the vinyl cylinder blow molded to shape of a glass

VINYL sheet

ALL PHOTOS: COUNTRY'S, FELSENTHAL & SONS

PEPSI-COLA has "hit the spot" again—this time with a king-sized glass syrup dispenser-display, fabricated of vinyl sheet material by G. Felsenthal & Sons, 4114 W. Grand Ave., Chicago 5, Ill., and involving some interesting processing techniques.

The plastic unit, which has the appearance of a large Pepsi-Cola glass filled with the sparkling beverage, is used to encase the dispenser tank which is mounted on soda fountain in full view of the public. Because of its striking appearance, this unique sales aid is rapidly finding its way to a prominent position on soda fountains all over the nation.

With its unusual size (8-in. diameter and 16-in. height) the simulated jumbo glass easily dominates the scene, functioning as a sparkling eye-catcher and sales help. Its syrup-true colors, mixed with the sparkling water effect, tickles the "thirst imagination" of the prospective patron with a tempting promise of cool and satisfying refreshment.

Preparing the vinyl sheet

The 20- by 25-in. sheets from which the giant glass is fabricated are 0.055 PM (polished on one side, matte on the other) clear Vinylite material. They are lithographed in four colors on the matte side. In processing the dispenser cover these sheets are first trimmed to correct size preparatory to rolling, then softened by being heated for 3 min. in an electric oven at a temperature of approximately 250° F.

With the lithographed surface on the inside, the sheets are rolled on a metal cylinder (Fig. 1) and permitted to cool in the rounded shape, after which the edges of the rolled sheet are lap welded together by elec-



1—In forming of these attention-getting display units, lithographed vinyl sheets are heated 3 min. at approximately 250° F. in the oven shown at extreme left. They are then rolled on a preforming cylinder preparatory to being electronically heat sealed along matching edges

tronic heat sealing (Fig. 2), the sealing operation requiring approximately 15 seconds.

Sealing and molding glass replica

The electronic equipment employed for this process is a 1 kw. Thermatron unit. The seam on the glass replica measures 16 in. in length, unusually long for heat sealing, and the thickness of the material requires extreme care in the operation of the specially developed fixture on the sealing unit in order to obtain a uniformly sealed edge approximately 0.110 in. thick. The sealing

fixture was specially engineered and built by G. Felsenthal & Sons.

After sealing, the Vinylite sheet cylinder is blow molded into glass shape on specially built autoclave-type equipment, employing a hot steam, compressed air water and chill method (Fig. 3). The entire operation is accomplished in a 6-min. cycle.

In this operation, 15 lb. of steam pressure are exerted by means of a rubber bag on the inside of the vinyl cylinder, forcing the heated plastic against the contours of the steel cavity. After application of steam for 1 min., steam is exhausted by air pressure, which for 2 min. holds the formed piece against the cavity walls that are simultaneously cooled by circulating water. The balance of the cycle covers the time required for inserting and removing the unit from the mold. The bag used for the molding operation is made of a special rubber

composition fabricated in strips on a mandrel, the strips being vulcanized together to form the completed bag.

Finishing and installation

After removal from the mold, the vinyl glass replica is sprayed with a white backup on the inside surface and the uneven edges at top and bottom are sawed off (Fig. 4). Use of a fixture for this operation insures even edges. Finally, holes are drilled along the top and bottom edges and the anodized aluminum cover and rim pieces are riveted in position on the glass. The dispenser cover is then ready for installation.

G. Felsenthal & Sons designed, developed and built all special tools, molds and fixtures employed in the production of the giant vinyl glass. A period of three to four months was required to engineer and develop the tools and perfect the manufacturing process.

formed into dispenser-display unit



2—The operator at right is sliding a rolled vinyl sheet on to the heating cylinder so that the edges can be lap-welded together. The actual sealing operation is accomplished in approximately 15 seconds. All the sealed edges are carefully checked by the inspector at the left



3—After the edges of the roll are heat sealed the vinyl sheet cylinder is blow molded into finished glass shape in a special type autoclave. A rubber bag inside the rolled vinyl sheet acts to force heated plastic material against the contoured inner surface of the glass-shaped mold

4—Among finishing operations performed on this vinyl glass replica is the sawing off of uneven top and bottom edges of the formed plastic part. This operation employs special fixture shown in this illustration which holds the unit in place and thus assures a uniform edge. Prior to this evening up, display has been sprayed with white backup on the inside surface. There remains but to drill holes along the top and bottom edges and to rivet the anodized aluminum cover and rim pieces in place on plastic.





COLOR PLAYS, COUNTRY CATALOG CORP.

Color, design and finish—three important elements in jewelry of all types—are dependent to a great extent in this line of quality costume jewelry on the properties of the cast phenolic that forms the base of these pieces. Judicious combining of engraving and plating permits a wide variety of two-color and filigree effects as evidenced in this color illustration. In addition the technique lends itself to modern design. Most of the work involves combination of machine and hand work—the machine work keeping down costs, the hand work imparting necessary individuality that is essential in the quality market

Quality jewelry uses cast phenolic

In the engraving and partial plating of variously colored stock lies the appeal of a new line of costume jewelry

Color — that compliments or contrasts with a costume.

Design—that imparts a note of individuality to ready-made clothing.

Finish—that is pleasing to the eye, long lasting in repeated use.

These three elements are important in all types of jewelry, whether intended for the chain store counters, the quality costume field or the precious jewels market.

All three can be achieved using plastics materials for they are effects that depend upon the very qualities for which plastics are most notable—colorability, formability and durability.

Plastics in the quality field

The mass low-cost jewelry market has long exploited these properties of plastics. But instances of the use of these materials in the quality costume field have been more rare. That this market is by no means closed to plastics is most recently attested by the engraved and plated Catalin costume pieces created by Egon F. von Seekamm of Suray, 115 W. 52nd St.

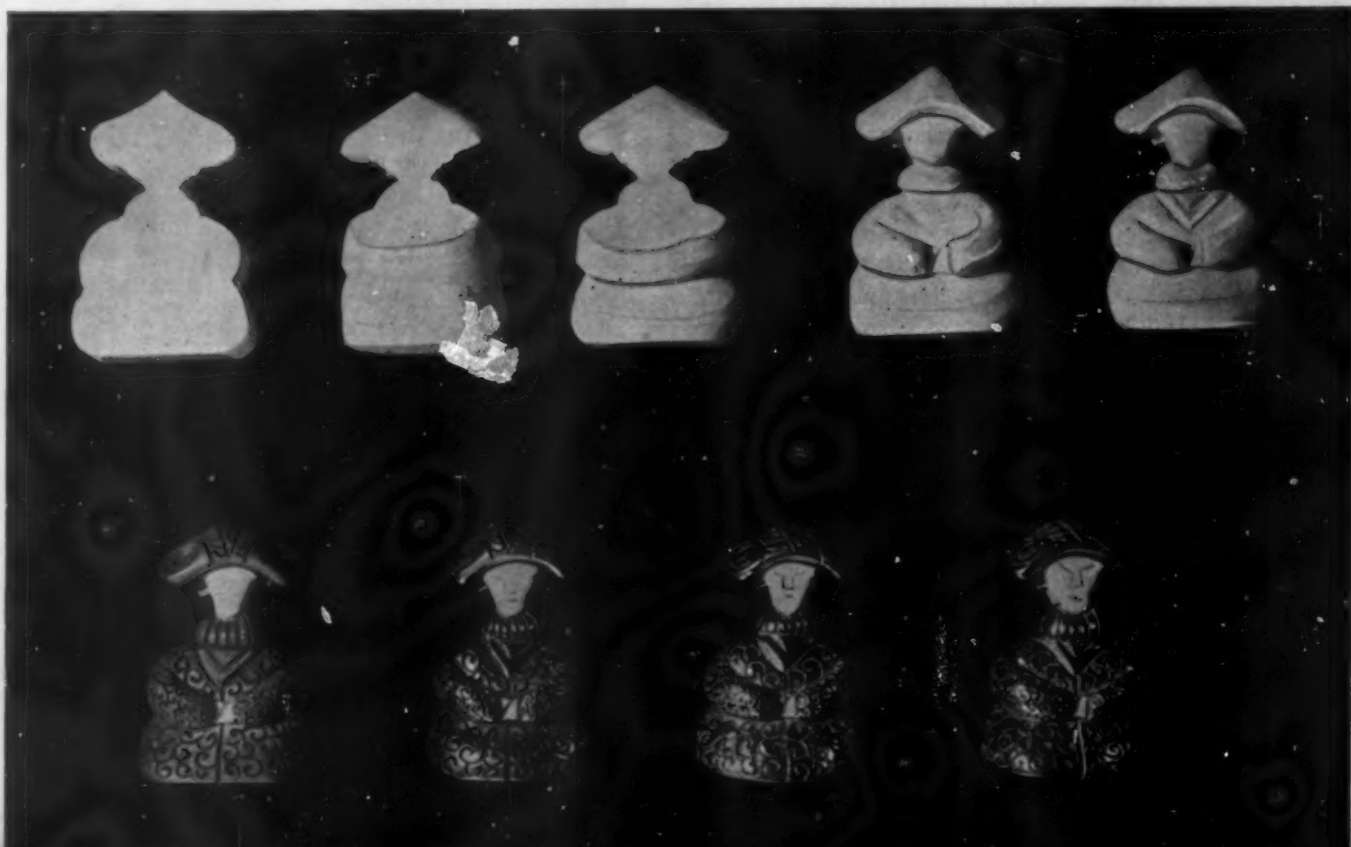
in New York City. The varied and attractive colors, designs and finishes created by this method of working cast phenolic are apparent in the color illustration on the facing page. Other designs are shown in black and white on page 106.

The process—step by step

The secret of the financial success and the popularity of these cast phenolic pieces in the quality costume jewelry field would seem to lie in a judicious blending of hand and machine work. Exactly how the material is worked is perhaps best exemplified by the illustration immediately below which takes a mandarin pin from its first rough stage through to the finished partially plated piece. The work on this item is typical of that involved in the production of all the pins, earrings, bracelets and other accessories that are developed and marketed by this company.

The first step is the cutting of a section of cast phenolic to the approximate size of the desired article from a piece of rod or tube stock. For the mandarin pin, opaque white material is used but costume pieces

This series follows the steps involved in the production of this cast phenolic costume jewelry. The work starts with a rough blank (top, left), progresses through various engraving stages and (bottom row) through three plating operations





Solid plating or filigree work are both possible with this method of producing quality jewelry from cast phenolic

have been made from almost every color stock, including black. This cut-out piece is then roughly shaped as at the top left in the picture on the preceding page. Working on a motor-driven shaper, and following by eye the design of a finished pin, the fabricator completes the shaping of the little figure, even to adding the thin lines that represent the pattern of the mandarin coat. All this depends upon the skill of

the operator in manipulating the cast phenolic piece so just the right amount of material is ground and buffed away.

Since parts of the mandarin pin are to be left unplated and the original color of the cast phenolic stock, these sections are covered with a special masking solution. There is no example of this step in the processing in the picture on the preceding page.

The next step is to make the material conductive. To do this the pieces are dipped in a special bath from which they emerge a dull grey. At this point the masking lacquer is removed and the parts are ready for copper electroplating. The copper coating is buffed until it shines, an operation that is followed by nickel coating. Again the pieces are buffed. Finally, with this substantial backing the pins or bracelets or earrings are submerged for a short period in an electroplating bath of gold. An 18-carat gold coating is applied first for hardness, followed by a coating of 24-carat gold for beauty.

Variety of effect

The mandarin pin that has been described is a simple work compared to the filigree bracelets such as are shown in the illustrations at the left. And to show that the Chinese motif is just a matter of present styling and not a limitation on the technique there are shown the modern flower pot design.

PARTS MOLDED AND EXTRUDED OF cellulose acetate butyrate in white, black or red control the pressure on clothes wringers made for electric washing machines by Lovell Mfg. Co., Erie, Pa. The pressure is exerted by means of two molded Tenite II screws—one on the top and one on the side of the wringer. The top screw is stamped in gold with "woolen," "linen" and "cotton" on one side and "low," "medium" and "high" on the other, so that the housewife will have no difficulty in selecting the proper pressure for wringing the different materials being washed.

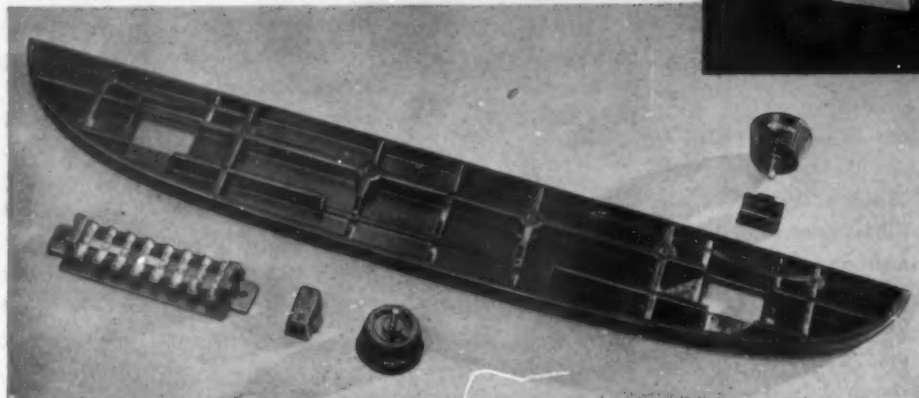
The plastic screws easily withstand the stress although the parts are hollow and thin walled. A ribbed inner construction provides maximum strength with a minimum of material. The Plastics Div. of Erie Resistor Corp., Erie, Pa., molds the indicating screws in a 6-cavity die and non-indicating screws in an 8-cavity die. The latter are molded around a metal insert by which they are later attached, in the assembly operation, to the wringers.

Pressure is released by two thin metal bars which are covered with strips extruded of

Tenite II by Erie Resistor. The flexible sections are snapped around the metal bars.



Five reasons for phenolic in mangles



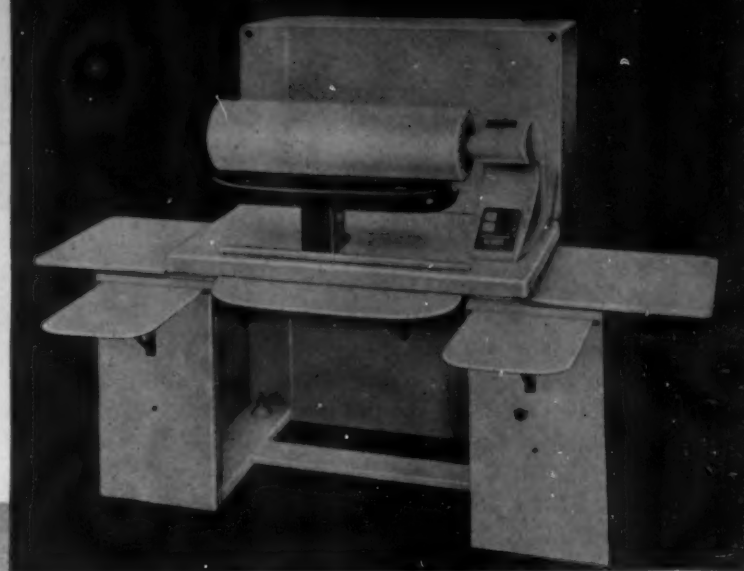
PHOTOS, COURTESY DUREZ PLASTICS & CHEMICALS, INC.

THE ROLE played by plastics—in this case, phenolic resin—in the new automatic ironer of Bendix Home Appliances, Inc., South Bend, Ind., is an excellent example of the now general practice of adopting these materials for a certain job because of their functional suitability rather than for their decorative appeal alone.

The forming table on the new ironer is mounted directly over the heated shoe. Pieces to be ironed are arranged on this table before being fed into the ironer. A number of properties are required of a material for this application. It must not conduct heat, as the forming board is in close proximity to the heated shoe. It should be dielectric as a safety factor and for greater ease of assembly. It must have a smooth surface with no rough edges or sharp corners. It should have a permanent finish that will not wear away or chip off. It should be easily formable to an intricate shape, again to simplify both manufacture of the part itself and its assembly to the ironer. Work on the production of this forming table indicated that no other family of materials could fill the requirements as well as plastics and that phenolic—in this case Durez—was the most suitable of the plastics.

Phenolic enjoys a number of advantages. This material can be formed to almost any shape in one molding operation. The part emerges from the die with finish molded in. It is ready for use except for removal of a slight fin which forms at the mold parting line. The finished part is self-insulating against both heat and electricity. The molded-in finish will not chip or wear away and the piece is light in weight.

The underside of the phenolic forming table is ex-



Insulation, smooth surface, permanent finish, easy forming are qualities imparted by phenolic to six parts in this ironer. Biggest part is forming table at left. Other phenolic pieces are two dial knobs, dial shaft, combination bearing and bracket, terminal block case

posed in the above photograph so that the ribs and bosses which are generally used in this type of part may be seen. These reinforcing sections are used to provide the necessary strength without sacrificing the lightweight feature of the molded plastic material. The ribs also prevent warping. The cut away sections of the ribs provide space for other parts of the shoe assembly. It is interesting to note the thick-section bosses provided in this piece to give positive anchorage to the threaded, molded-in inserts. The inserts are used to fasten the table piece to the shoe.

Other phenolic parts

As for other Durez phenolic parts employed in this ironer, they too required special properties in the material from which they were to be made. The two thermostat dial knobs (mounted in holes on the forming table and thumb-adjusted to regulate the temperature of the shoe) require much the same properties as the table itself.

The molded-in shaft and lettering of the knobs are additional features from a production standpoint. The dial shaft combination bearing and bracket (two of which are attached to the underside of the forming table to support and locate the dials) takes advantage of the mechanical strength and wear resistance of the phenolics. A molded-in projection fits into a groove in the dial knob and limits the distance the knob may be turned. As for the terminal block base, electrical insulation was the chief consideration in choosing Durez phenolic. The excellent dielectric properties of the phenolics suit them ideally for such parts.

IT IS POSSIBLE THAT THE VINYL PASTE resin introduced by B. F. Goodrich Chemical Co. will mark another milestone in the development of the vinyl industry in this country. The changes may come slowly but over a long pull there is a good possibility that vinyl paste will not only reduce processing costs for film, sheet and coated fabrics, but will provide another material formable without pressure in simple molds.

Attention has been previously called to vinyl paste by MODERN PLASTICS in the September 1945 and June 1947 issues. This last article reported on the widespread adoption of paste processing in Great Britain where it has attained importance, as in Germany during the war, partly because of a lack of solvents which are necessary in many other types of vinyl processing. The new Goodrich resin is based on study and interchange of information on those European methods.

There may be some questions in the industry concerning the difference between this new paste forming resin and other paste resins. Without going into too much detail, it may be explained that in general a paste compound is one containing resin and plasticizer in varying amounts for such applications as coating, dipping, molding and casting. When a large quantity of plasticizer is used, in order to obtain paste fluidity, the resultant product is generally very soft and tacky. To make a more workable substance, a diluent (solvent) is added. The diluent is usually kerosene or some similar aliphatic which, during final processing, must be removed. This is usually an expensive and hazardous operation. Here is a hypothetical example. If a processor wants to produce a film of 2200 lb. tensile strength with an elongation of 350 percent and a hardness of 75 (Durometer A), he will have to use, say, 60 parts of plasticizer to 100 parts of resin. With the generally accepted paste formulations, a 60-100 mixture is difficult to spread and end-products are generally tacky. So the processor adds a diluent which must be removed during final processing.

The newly announced paste resin is supplied so that it can be mixed with 60 parts of plasticizer, or in many other variations, and no diluent is required unless a processor desires to make a compound of lower viscosity than is normally obtained with this ratio. For certain applications where a hard finish is desired, a diluent is added to this new resin for the purpose of limiting the amount of plasticizer without sacrificing low viscosity. Diluents will, of course, continue to be used in some cases for special purposes where pigments and loading materials are added and by fabricators having equipment remove solvents.

THE SEARCH for simplicity in processing and fabricating techniques is a task of all industries. To reach this goal, newly evolved materials, products or processes must be achieved without loss of quality or rate of production.

A development of importance in the vinyl plastics field that provides simplicity in processing is a true polyvinyl chloride paste forming resin recently announced by B. F. Goodrich Chemical Co. This new thermoplastic, called Geon paste resin, is most significant in that it is easily dispersed in plasticizer and with a minimum of equipment may be molded, cast, coated or dipped. It eliminates the necessity for heavy and expensive mixing equipment and will produce the same type products commonly made by calendering, solution and latex coatings. The whole concept of this vinyl paste resin can be exemplified by briefly pointing out the marked differentiation in processing techniques between vinyl latex, solution and paste coatings.

The latex is a dispersion of very small particles of vinyl chloride resin in water. Plasticization is accomplished by adding a concentrated emulsion of plasticizer to the latex. In coating applications, the water phase of the dispersion must first be evaporated, after which the deposited plasticizer and resin particles are fused by exposure to a temperature of 300° F. Evaporation requires heating equipment of varying size depending upon the application.

In solution coating with vinyl resins, a solvent such as methyl ethyl ketone is added to the resin together with a plasticizer. Due to limited solubility, it is necessary to use large quantities of solvent and there is danger of the solution gelling, which makes application very difficult. Solvents are definite fire hazards and their high cost requires expensive recovery equipment.

The new paste formulation obviates several objections inherent in the latex and solution systems. With this recent development, it is possible to disperse the resin in plasticizer, and then with simple processing equipment and proper heat treatment, produce an article possessing the same excellent qualities of the resin mixed and applied on conventional equipment to equivalent resin-plasticizer ratios. Success of this method for formulating paste resins depends upon the fact that solvation or plasticization of the resin is extremely slow at room temperature. As a result, it is possible, when operating at room temperature, to blend resin and plasticizer with the plasticizer serving as a vehicle to carry the resin. At room temperature the plasticizer remains as a separate liquid or external lubricant for the resin. However, upon heating, plasticization takes place with the liquid plasticizer being absorbed by the

* Development Engineer, B. F. Goodrich Chemical Co., Cleveland 15, Ohio.

resin

by M. N. BURLESON*

Coating of textiles offers important outlet for vinyl paste resin. Here this paste is being applied to printed fabric by means of a laboratory knife coating machine



resin. This fusion of resin and plasticizer acts so as to form a tough, solid and useful flexible mass.

In conventional processes where vinyls are calendered, extruded or molded, heat is necessary during at least two operations. The resin is first plasticized on a hot mill and then calendered by hot rolls or extruded through a hot die. In the paste system, heat is necessary once and must be sufficient to drive the plasticizer into the resin. This necessitates heating the mass to 325 to 350° F. for the fluxing or fusion of the resin and plasticizer. The physical properties of the resultant articles are dependent on the success of this heating process. Since there is no chemical reaction involved, it means that the mass is simply brought to temperature desired.

This vinyl paste resin is a free flowing white powder with a specific gravity of 1.40. Particle size ranges from 1 to 30 microns with a mean diameter of 8 to 10 microns. With proper wet or dry grinding, the agglomerates may be broken down to a 1 to 5 micron range which is optimum for most paste formulations. In some instances, it may not be necessary to grind the resin at all.

Formulation

B. F. Goodrich Chemical Co. has developed a series of paste-forming resins varying somewhat in formulating

Table I—Typical Properties of Geon 100-X-210 with Varying Amounts of Resin and Plasticizer

Geon 100-X-210	45	50	55	60	65	70
Dioctyl phthalate	55	50	45	40	35	30
Hardness (after fusion) Durometer A	50	55	65	70	80	90
Initial viscosity centi- poise ^a	1000	2900	3000	3500	7500	87,000

^a A single reading taken with a Synchro-Lectric Viscosimeter.

and processing methods and also in the final physical properties obtained. In order to describe a paste-forming system in the most simplified way, the new Geon 100-X-210 has been selected for description in this article. Properties of this resin are shown in Table I.

Geon paste resin is applicable to two distinct formulating methods. The first of these is a straight resin-plasticizer mixture, where the resin is merely dispersed in plasticizer by simple stirring. The other involves the addition of a volatile diluent to the resin-plasticizer mixture. This latter method makes possible a wide range of hardness in finished products.

Resin-plasticizer system

Paste formulation using the resin-plasticizer system is quite simple. The best dispersion is obtained by adding the resin to the plasticizer and, for some applications, this is accomplished by simply stirring. An ink mill employing only a few passes may also be used to give an excellent dispersion. Care must be exercised however, to cool the rolls as heat will thicken the paste mixture. For coatings that are not subsequently embossed, it is advisable, if simple mixing is used, to dry-grind the resin. This grinding is not necessary for molding applications.

The fabricator should never lose sight of the concept for which a paste resin is designed, that is, the achievement of a fluid and easily applied thermoplastic material. Thus, the choice of plasticizer is extremely important. Selection should be limited to those that give the formulation a low viscosity and a slow rate of solvent action at room temperature, and when heat is applied, plasticize the resin rapidly to produce a solid fused mass. Other properties to be considered when choosing a plasticizer are low temperature flexibility, volatility, odor, color and compatibility. Recommended plasticizers are dioctyl phthalate, trioctyl phosphate and di-n-octyl phthalate. (Please turn to next page)

Blends of plasticizers such as dioctyl phthalate and triethylene glycol esters have proved useful in lowering the viscosity and reducing thixotropy. There are many more combinations that may be used. It is simply a matter of keeping in mind the properties desired in the finished product.

Resin-plasticizer-diluent

Paste formulations employing a diluent are also relatively simple. The principal advantage of this system is that the diluent provides additional volume and retains fluidity during fabrication even with low plasticizer content. Thus, it is possible with this system to gain varying degrees of hardness in the finished product. Straight chain aliphatics just above the gasoline range in molecular weight are recommended as diluents because they do not swell the resin, thereby maintaining low viscosity and increased storage life. The evaporation rate with this type of diluent is rapid enough so that none will remain after the resin has been fused. Small quantities of active solvents such as ketones and esters may be added to the mixture as an aid in stabilizing the mix. These ingredients also help in the fusing process by softening the resin for the plasticizer.

The choice of plasticizer for the diluent system is very important for, as in the resin-plasticizer system, it must act as the dispersant as well as the plasticizer. Dioctyl phthalate is commonly used but other plasticizers deserve consideration. Blending of plasticizers in this system is also desirable because frequently the dispersing qualities may be controlled in this manner.

General formulating practice

Like all organic material, vinyl resin tends to decompose to some extent on exposure to high temperatures. Consideration should be given to the use of heat stabilizers such as SN or V-1-N with paste resin to reduce the possibility of heat breakdown during the fusion.

Paste formulations, unless controlled, exhibit unusual flow properties. The extent to which thixotropy (structural buildup on standing and breakdown on mixing) concerns a formulator depends upon the end-use of the mixture. For coating, casting or dipping, it is not a desirable condition and must be controlled. This can be done in the resin-plasticizer system by using a blend of various plasticizers. In the resin-plasticizer diluent system, thixotropy may be controlled by the use of active solvents for the resin such as methyl-isobutyl ketone. These materials serve as dispersants for the resin and aid the plasticizer in giving a stable dispersion. This active solvent also serves to lower the fusion temperature somewhat and improves the film forming properties of the paste resin. Because the active solvents cause the resin to swell slightly as the paste is heated, plasticization takes place more easily.

Other ingredients added to Geon paste resin include colors, fillers and stabilizers such as lead carbonate or lead silicate. An unlimited choice of colors, from delicate pastels to rich bright hues, may be used in paste formulations. Titanium dioxide, lead titanate and

basic lead carbonate are all acceptable as base or covering pigments.

The choice of color pigments is generally governed by the stability of the shade with respect to heat and light. Colors that have been satisfactory for conventional vinyl compounding also show good results with the paste resin. They are anthraquinone and indanthrene blues, yellows and orange; phthalocyanine blues and greens; and the cadmium and lithol reds.

Fillers such as clay or whiting should have as low an oil absorption factor as possible. The maximum amount of plasticizer is then available for lubrication and dispersion of the resin.

All pigments should be added to the paste mix as dispersions in plasticizer. This should be particularly true in simple mixing when using the resin-plasticizer formulation, because stirring will not disperse the loading agent or color sufficiently. In the resin-plasticizer diluent system the mixing efficiency of the ink roll or ball mill will be enhanced by adding the pigments as dispersions 2 to 3 hr. before the milling is complete.

Applications

Applications for Geon paste resin cover the fields of low pressure and cast molding, spread and dip coating. Products are equivalent in quality to those made by calendering, molding, solution and latex coating. Laboratory experiments have shown excellent reproductions of surface, good stability and no residual stress or strains when using paste materials.

On the basis of present trends, paste technology gives every indication of competing for and capturing a substantial part of the vinyl sheeting business. Solution coating is an old industry and has not only had the disadvantage of expensive and flammable solvents but has been hampered by the fact that substantial coatings have always required a great many passes through the coating machine. The new paste process permits laying down of films or coatings up to twenty mils thick in one operation. Therefore, the range of films that can be produced by paste processes can be varied to include thin films useful in good packaging, films of medium gage for raincoats, shower curtains, aprons, etc., and heavy films practical for upholstery and luggage. Moreover, these films respond to embossing techniques in the same way as those produced by any other process. Single pass operation will be a powerful stimulus in converting conventional methods to this new and economical technique.

Heretofore, in molding polyvinyl materials, it has been necessary to use either injection or compression molding machinery. Articles molded from the new vinyl paste resin exhibit the same excellent service qualities as those obtained from conventional resins. Since they are thermoplastic and will deform with heat, products that will undergo high heat are not suggested. Gaskets, shoe soles, printing rolls and novelty items are only a few of the articles that can be molded with this new low pressure technique. Children's toys, including exquisitely molded dolls, can be made by paste

molding processes. Never before have the properties of vinyl resins been within the scope of such applications in which the desirable features of tear strength, non-toxicity and permanence are so necessary.

The electrical industry has for years been searching for a material with which to fill the voids in the cores of large electrical cable. These voids have always been troublesome because of ionization difficulties that, during a moment of electrical stress, might quickly cause failure of the cable. Vinyl paste formulations have shown promise in this type of use because they can be so readily forced into the interstices of cables and fused in place.

The use of Geon paste resin in dipping applications is extremely interesting. Using the resin-plasticizer formulation, it is possible to obtain a very thick coating with a single dip. Dipping is aided by preheating the article to be coated. Preheating sets a thick layer of paste next to the dipped surface. The quantity of paste compound picked up by a dipped article can be controlled by the viscosity of the formulation and by the amount of heat added to the dipped part. If a thin coating is desired, it is not necessary to preheat for enough material clings to the article to give a smooth continuous film. Large potential volume is indicated for dipping with paste materials for such applications as gloves, toys, dish drainers, plating racks and thin-walled electrical insulations.

Processing

Processing with vinyl paste resin follows the same pattern of simplicity as exhibited in the technique of formulation. Mixing and grinding is commonly accomplished through the use of a pebble mill. Flint pebbles or porcelain balls are preferable as a grinding media. Steel balls may be used if care is exercised to prevent iron contamination, since iron causes discoloration and may initiate breakdown of the base resin.

Certain precautions must be followed during grinding, mixing and handling operations. Heat build-up should be kept at a minimum, since heat from any source causes a marked increase in the viscosity of a paste formulation. Care should be exercised to cool the mixture while stirring or grinding. Storage of the mix prior to use should be in a cool place away from radiators and steam pipes, for the same reason.

The casting of thin films one to four mils in thickness is a relatively simple operation. The paste is coated on a temporary support such as a stainless steel belt, fused with heat, and the resultant film stripped from the carrier. Casting films with pastes enables a processor to control the gage of film to very close tolerances, down to one ten-thousandth of an inch. This is a decided advantage which is becoming more and more important in view of recent progress in electronic heat sealing, a process that requires extremely close gage tolerance of the vinyl film, for fabricating finished products.

Low pressure molding techniques formerly confined to the casting or pouring resins that could only be con-

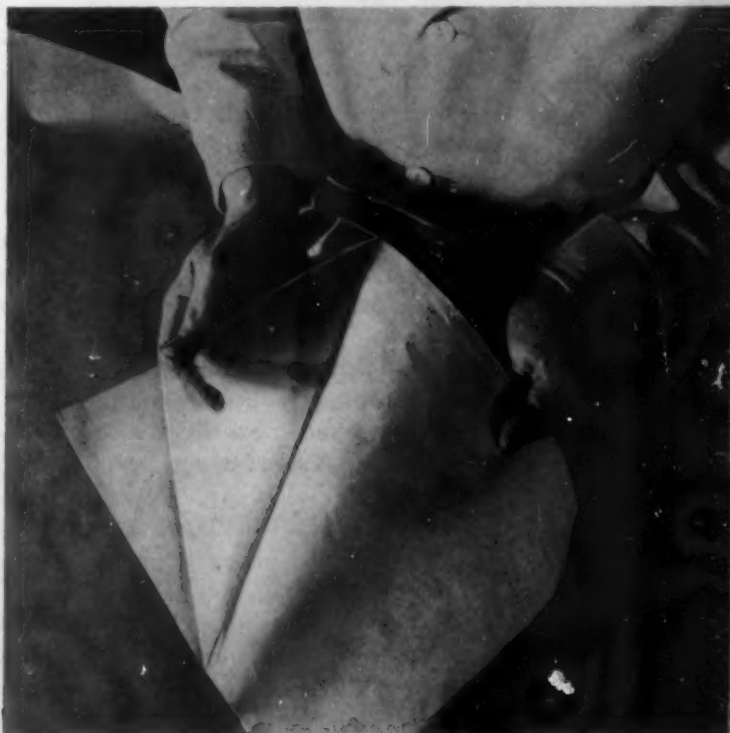
densed or polymerized are now possible with paste formulation. A fabricator is now able to get the desirable properties of a polyvinyl material without expensive molds and machinery of conventional methods. Since a Geon paste resin formulation is a liquid and will fuse and knit together with application of heat, it is a simple operation to obtain molded polyvinyl materials without applying pressure. With the resin-plasticizer system, there is practically no shrinkage in the mold because of the absence of a chemical reaction or the loss of volatiles. Liquid plasticizers have a small degree of volatility, hence their small shrinkage.

The use of the resin-plasticizer diluent system for impregnations is an extremely interesting application. Here too, conventional techniques and equipment can be used. That is, the formulation can be applied to a base material in a bath, the excess removed with rolls and the resin fused at a temperature of 325 to 350° F.

Conclusion

Paste type resins respond to fundamentally simple formulating and processing methods. They can be converted to plastic products which have excellent physical and chemical properties. Paste technology has already demonstrated that it can produce superior products to those made by older conventional methods. This can be clearly seen in the unsupported vinyl sheeting and film markets where paste resins have achieved high strength, freedom from residual strain, uniform properties in all directions and extremely close gage tolerances—all this with sound economy.

Cast vinyl paste film is stripped, after fusion, from the paper sheeting that served as a carrier for the film



A 4-part polyester impregnated glass mat bucket

THERE are advantages aplenty for the sportsman in the new low pressure molded Fiberglas mat-polyester resin minnow buckets that have made their appearance this season. Not only does this Minnow Float bring new standards of light weight, durability, integral color and freedom from rust to this sports accessory but it has the unique property of being able to float in an upright position when fully loaded, due to an inner ring of Styrofoam. But aside from these attractive properties, the bucket is of interest because its production involved the adaptation of several rapid fabrication techniques to low pressure laminating field.

Developed by Sam Shobert of the Motor Tool Mfg. Co., Cortland at Cloverdale, Detroit, Mich., the bucket is now in production by that organization and is being promoted in media reaching sportsmen. Raw T-34 Fiberglas mat is the filler material used throughout the bucket. The polyester resin is Selectron 5003, to which is added 5 percent green color paste, also supplied by Pittsburgh Plate Glass Co., 632 Duquesne Way, Pittsburgh 22, Pa. The completed bucket, a pleasing green in color, is finished off with a fish-shaped gold decalcomania. Wall thicknesses run to 0.050 in. except on the bottom of the bucket where the reinforced lip measures $\frac{1}{8}$ in. to provide extra strength required at this point.

Structurally, the bucket includes an inner and outer shell, formed by separate male and female molds, and fused later into a single unit. These two cylindrical sections are shaped from preforms, made by stapling pre-cut pieces of T-34 mat on wooden forms. Also molded of Fiberglas mat are the circular lid and the perforated inner strainer by which minnows are raised for removal.

Molding body of bucket

Molding of the inner and outer shells is handled on a specially built air-operated press, using chrome plated steel dies and a molding pressure of 50 p.s.i. A measured amount of the die-bearing resin is introduced into the female cavity after the preform has been placed in position. As the male plug enters the cavity, resin is squeezed up through the dry preform, insuring uniform resin distribution.

With a molding temperature of 270 to 280° F., provided by nichrome ribbons wrapped around the molds, curing time on the outer shell runs slightly under 1 $\frac{1}{2}$ minutes. Approximately 200 of these parts can be made in a normal 8-hr. working day. The incorporation of a cutting edge on the mold, which stamps a circular opening in the shell at the time of the molding, eliminates the need for an extra finishing operation and insures minimum waste of material. This opening, cut in the bottom of the outer shell, actually becomes the mouth of the finished bucket.

Although it has a decided draft, the outer shell holds

The adaptation of several rapid fabricating methods to the low pressure field features the molding of this durable, lightweight, rustproof minnow bucket



These four variously arranged finished minnow buckets afford a clear picture of the overall construction of the unit which employs a total of five different plastic parts

firmly to the force plug when the mold is opened and is released without difficulty. Possible sticking of the shell in the cavity is eliminated through the use of series of dents or dimples around the upper circumference of the force plug. During the molding operation, the Fiberglas material is forced into these depressions, so that the shell is held in plug when the mold opens.

The inner shell, slightly smaller in diameter, is molded in the same way. Since the walls of this piece have very little taper, sufficient gripping action is produced to insure easy withdrawal by the force plug.

Assembly of shells, handle and float ring

One of the toughest problems encountered in the molding of the bucket had to do with the method of fastening the wire handle securely to the outer shell:



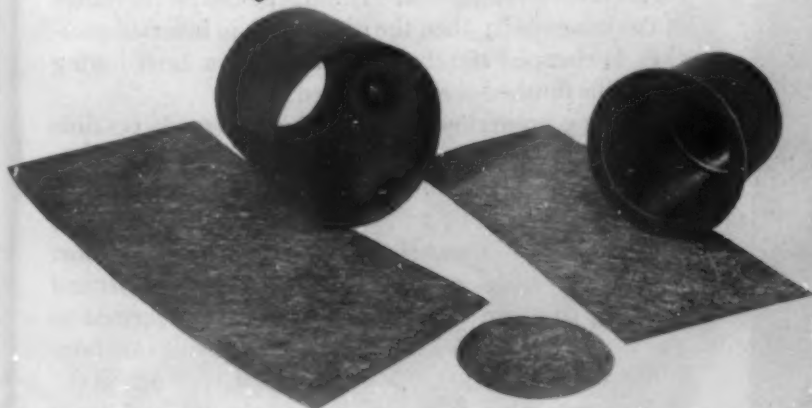
In molding outer shell, glass mat preform is first placed in the cavity, then a measured amount of polyester resin added



Outer shell adheres to the force plug as the mold opens because of small depressions near top of plug

ALL PHOTOS, COURTESY MOTOR TOOL MFG. CO.

The outer shell (left) and inner shell (right) are molded separately, then fused into a single unit



Expanded polystyrene which gives buoyance to the bucket is first cut in strips, softened at around 300° F. and then formed to desired shape

Jig used to form expanded polystyrene is actually a cut-off section of one of the shells. The rings thus formed are later cemented into top

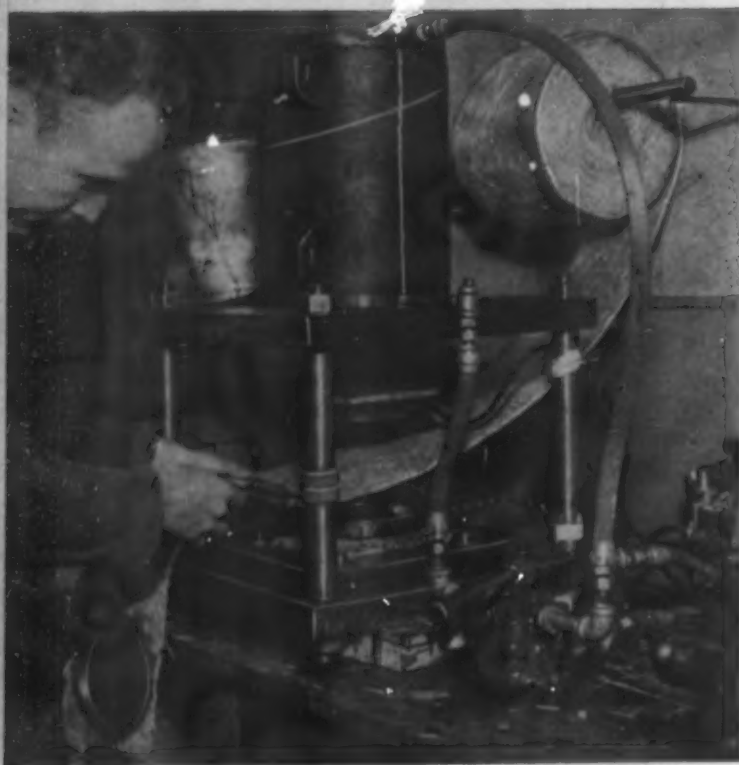
Inner shell (above) is molded in same manner as outer shell. Temperature of mold, around 275° F., is held by resistance wires placed in mold





Farleft—In assembling inner, outer shells of this minnow bucket, inner bucket is placed in a support and resin applied to flange at the top. The outer shell is then placed over the inner piece

Left—A toggle mechanism holds two shells tightly together while electrical heating elements polymerize polyester resin and form the shells into one unit



Efficient production of outer lid pieces is attained by forming them from continuous roll of glass mat. Proper volume of resin is introduced into shallow female cavity before each cycle. Cutting edge of die cuts the lids out at the same time they are formed. Pins simultaneously perforate the lid. Inner strainer is produced in same manner

the means of attachment had to meet appearance standards and also had to be so strong that no normal amount of strain could tear the handle loose. Although the bucket itself weighs only $1\frac{1}{2}$ lb., the total weight when loaded with $1\frac{1}{2}$ gal. of water and a "full house" of minnows is something over 12 pounds.

The lugs on the bottom surface of the outer shell, into which the wire handle fastens, are formed of wads of

glass mat which are stuffed into openings in the nose of the force plug before the mold is closed. Openings for the insertion of the wire are drilled later. Use of wads of the mat material rather than rolls was found to result in an extensive overlapping of fibers, producing a lug which cannot be torn from the bucket without literally rupturing the shell itself.

The inner and outer shells of the bucket are joined into a single unit with heat and pressure applied with a toggle press arrangement. Resin is placed on the flange of the inner shell; then the outer shell, in inverted position, is clamped tightly over it. After a brief curing cycle, the finished shell is removed.

Floating properties of the bucket are made possible by an inner flotation ring of Styrofoam. Bought in 1-in. slabs, the foamed polystyrene is sawed into pieces measuring 1 by 1 by 24 inches. Individual strips are then impaled on a metal point and inserted for a short time in a heating chamber. After softening at around 300° F., the strip is withdrawn and quickly formed to the required circular shape in a jig. The rings are later cemented into bucket top with asphalt type adhesive.

The remaining Fiberglas parts—the lid and inner strainer—are molded on electrically heated molds, using the same technique as on the shell sections. With a molding cycle of about 30 sec. on these parts, rapid output is attained by feeding the T-34 mat into the mold from a continuous roll mounted beside the press. Dies have a cutting edge which stamp out the pieces as each is molded, as well as pins which simultaneously produce the necessary perforations. This continuous molding method is fast and holds material waste to minimum.

As shown in accompanying photographs, the inner shell section is drilled with a series of holes near the top to permit free circulation of water through this section of the bucket. Other fabricating operations include drilling of the handle lugs, fastening handle in position, screwing a small plastic knob and metal spring clip to the lid, attaching the perforated inner strainer to the lid with a length of nylon filament, and finally, application of the decalcomania.

Plastics Products

↑ The ink reservoir of the Eversharp CA ball point pen consists of a spiral wound coil of thin-walled polythene tubing down which ink flows, providing a uniform feed. This Aeroflex tubing is extruded by Anchor Plastics Co., Inc., as is transparent Tenite II outer tube of pen cartridge. Block at end of tube is also Tenite II

This champagne bucket, 8 in. high with a width of 6 in. at the base and 10 in. at the top, is being molded of transparent green Styron by Cruver Mfg. Co. for use by Roma Wine Co. in a national sales promotional plan for its champagne. Glued to three gold filled grooves on each side of bucket are styrene nameplates wiped in gold



Addresses of firms mentioned on these pages are on page 190



↑ A new note is sounded with this AMI, Inc., Model A juke box designed by Barnes & Reinecke, Inc., with panels made of Plexiglas lighted within by colored fluorescent tubes. Klise Mfg. Co. forms panels by air pressure

◀ Scooping and ejecting ice cream can be performed without shifting hand position on this Medco scoop made by Measuring Device Corp. Too, Chemaco ethyl cellulose handle, molded by Cowan-Boyden Corp. is pleasant to the touch



Plastics Products



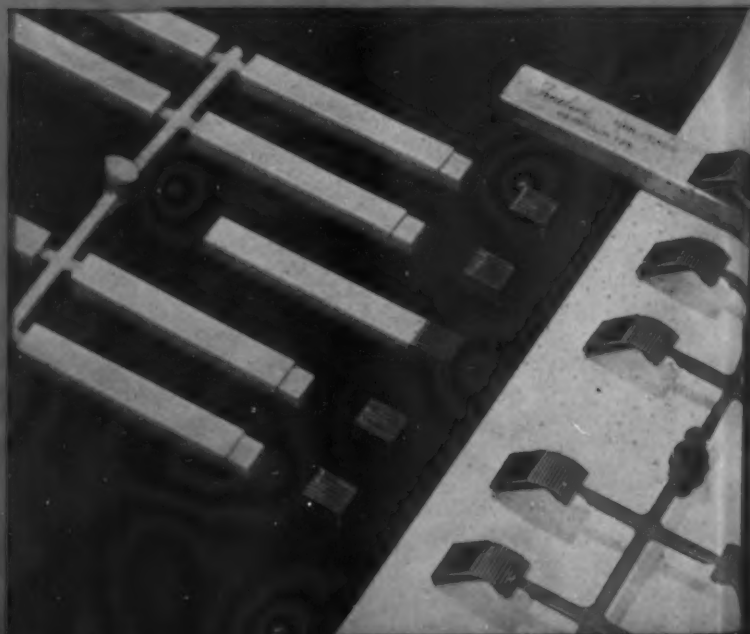
Stacking winnings is easy with this individual playing chip rack molded and distributed by Prisk Plastic Molding. Racks, of brown or black Bakelite phenolic, come in sets of four, are unaffected by water or alcohol and will not burn or chip. These advantages hold for individual coaster-ash trays, also molded of Bakelite resin. A cigarette placed in groove of ash tray section will snuff out of its own accord if left for any length of time

Resiliency and dimensional stability of Tenite I and II make them ideal for these W. A. Sheaffer Pen Co. pencil lead containers. Two types are available—one, of Tenite II, having rounded ends and hinged lid; the other, of Tenite, having conventional oblong shape with cap top. Caps and flip tops are blue; cases are yellow or black. Both containers are injection molded by Injection Molding Co. Flip-top is assembled by fitting two molded lugs on top into holes in case



Ideal for close quarters is this handy-size combination tray-cocktail table with collapsible legs and tray of black phenolic resin. Plastic Molding Corp. compression molds the tray frame of Resinox or Bakelite for Modern Living, Inc. This material was selected because of its high finish, stain resistance

The full addresses of companies mentioned on these pages may be found on page 190



PRECINCTS & RADIO MOTOR PATROL CARS														
100	101	102	103	104	105	106		108	109	110	110A	111	112	114
701			716							994		888		741
	601									996				
		800									885		880	
									802					
					993						848			
		711						881						
CRMP						728	EMERG SQUAD							



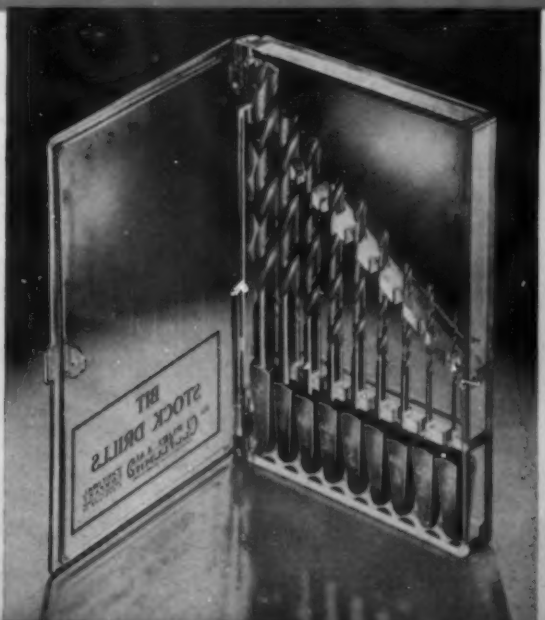
Location of patrol cars can be told at a glance on this radio-car dispatching board designed by Printloid, Inc., and the New York City Police Dept. Molded Plastacele letters are attached to a 2 by 5-ft. Lucite sheet for permanent marker headings. Black acrylic lacquer outlines rectangular openings through which light appears. Hooks are sealed above each space. Finally, transparent Plastacele squares, with numerals of various squad cars printed on them, may be hung over the openings on hooks

Resistance to water, chemicals and aging, non-flammability, gloss, flexibility and good adhesion are qualities which led to selection of Vinylite resin coating for this new R. H. Bishop Co. food freezer. Developed by Pyroxylin Products, Inc., this finish offers economies in production since it does not require costly air conditioning and drying oven equipment. It is suited for coating flat metal sheets before final fabrication since it withstands drawing, stamping or other forming

A strikingly designed Plaskon housing is featured in this Versatex microphone that can be used as hand microphone, placed on desk tops or floor stands for home recordings, public address systems. Microphone which is molded by Chicago Die Mold Corp. has a built-in protective resistor

A handsome case of clear Tenite sells graduated set of nine bit-stock drills for Cleveland Twist Drill Co. Grooved retainers keep drills in order. The case, which is molded by Standard Molding Corp., can be shipped, carried or stored without danger of breaking the drills. The lid opens on two hinges and is snapped shut by means of a flexible lug which closes against a small metal pin

Dealers may keep their names before customers with these Tenite II auto tags produced for Bernard Stamp Engineering Co. by Champion Molded Plastics. To cut costs, bases are produced in one mold in conjunction with other molds for lettering—a different one for each advertiser. Tags will withstand oil and dust of road travel





▲ This Lumarith shade in ivory or mahogany, designed to hold an 8-watt fluorescent tube, has a built-in filter to eliminate radio interference. Injection molded by Boonton Molding Co. for Acme-Lite Products Co., it has hooks for hanging on beds, holes for wall installation



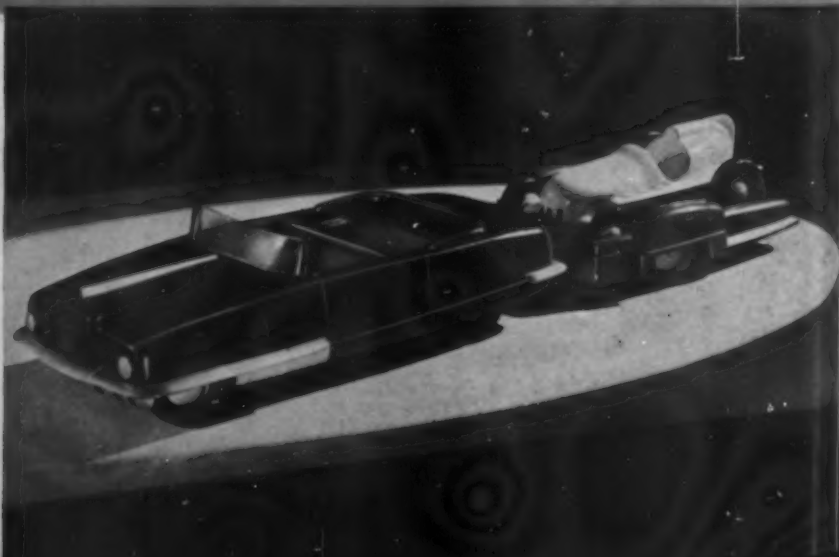
▲ Costly errors can be eliminated by this cap and bottle gage which quickly shows right size and Glass Container Association finish of caps and bottles. Caps are slipped over top projections, bottles into bottom cut-outs. Gage is made of Synthane laminated cloth base phenolic for Stanley Sapery. The lettering is hot stamped



◆ New engineering developments—many involving extensive use of plastics—have been incorporated into buses now coming off the production line. Here a young woman is using a plastic signal cord to notify the driver of her approaching stop. This signal cord, which is being marketed under the tradename of Connecord by Jessall Plastics, Inc., is made from Geon polyvinyl plastic. Plastic cord has advantages of being impervious to acids, greases, and resistant to heavy wear such as is encountered in transportation field. Damp cloth removes dust

▲ Soft formed curls are assured with these Bakelite polystyrene curlers precision molded by American Molding Co. with teeth that secure hair firmly. They come in various colors, are light weight, non-flammable, resist chemicals

▲ Lustron or Bakelite polystyrene are used for Kar King toy car, trailer and racer just introduced by Glen Dimension Co. and molded by Norco Plastics Co. Top half of roadster is blue; bottom half white. One-piece trailer is red; two-piece racer yellow. Windshield is punched from acetate sheet. Sellon-Collins designed this unit





Heat resistance, clarity in new acrylic

AN ACRYLIC injection molding powder that would impart higher heat resistance to molded parts has long been sought by the molding industry. In the past, manufacturers of acrylic molding powders have supplied heat resistant formulations, but frequently at the expense of other characteristics which are essential to satisfactory molding.

Preliminary data on Plexiglas V,¹ a recently announced acrylic injection molding powder, indicate that the product not only provides heat resistance of a high degree, but improved moldability as well, through a low flow temperature. In addition, the manufacturer claims that articles molded from the powder have a transparency that is noticeably greater than the clarity to which the descriptive term *crystal clear* is generally applied.

An interesting figure in the table of properties for Plexiglas V is the extremely small amount of shrinkage at 100° C. of an injection molded test bar. Users of injection molded articles have pointed out in the past that, from a practical standpoint, a high heat distortion temperature is of advantage only when it is combined with a low shrinkage factor. A molding powder such as this new acrylic, which imparts both properties, provides genuine stability at prolonged high service temperatures. (Please turn to next page)

Table I.—Preliminary Data^a on Plexiglas V
Injection Molding Powder

Property	Test conditions	Plexiglas V
Tensile strength	1/4 in. Max. 1/4 in. Rupture	9000 p.s.i.
Flexural strength	A.S.T.M. D650-42T Maximum Deflection Modulus of elasticity	15,000 p.s.i. 0.3 in. 400,000 p.s.i.
Impact strength	A.S.T.M. D256-41T Charpy unnotched (1/2 in. × 1/2 in. sect.) Charpy notched (per in. molded notch) Izod (milled notch) (per in. of notch)	3.2 ft. lb. 0.48 ft. lb. 0.44 ft. lb.
Rockwell number	1/4-in. Ball, 100 kg. load	M-91
Shrinkage of injection molded bar	2 hr. at 100° C. 48 hr. at 100° C.	0.005 in./in. 0.013 in./in.
Flow temperature	A.S.T.M. D569-43T At 1500 p.s.i.	158 ± 5° C.
Mold shrinkage	(Cold mold to cold piece)	4-6 mils/in.
Heat distortion	A.S.T.M. D648-45T 2° C./min.—264 p.s.i. "as received" Normalized 48 hr. at 70° C.	90° C. 94° C.
Specific gravity	A.S.T.M. D71-27	1.19
Refractive index	.....	1.49

^a Not intended for specification purposes.

¹ Produced by the Rohm & Haas Co., Philadelphia, Pa.

Initial applications for the improved molding powder are reported to be mainly in the automotive field, where several manufacturers have specified the material for hood ornaments, instrument panel dials and other acrylic parts. The powder has also been molded in a variety of thin and thick shapes such as water tumblers, brush backs and street lighting globes.

For economy and ease of molding with this powder, the manufacturer recommends cylinder temperatures of 440 to 480° F. (227 to 249° C.). Molding runs in

the material manufacturer's sales service laboratory have indicated a preferential mold temperature of at least 150° F. (66° C.). Mold designs should incorporate the general practices that have been found to give best results with acrylic powders—sprues, runners and gates should be as large as possible, to insure high production and to keep rejects to a minimum.

The figures in Table I are said to represent average values obtained with accepted molding techniques and test methods.

ANOTHER PROPIONATE MOLDING powder was made available to the trade when Tennessee Eastman Corp. recently announced Tenite III, the trade name for their cellulose acetate propionate plastic which is offered in pellet and granular form for injection molding and continuous extrusion. The price is 59 cents a lb. for plain colors in 30,000-lb. lots of one item. Black is 50 cents.

The announcement came as no particular surprise to the industry since well-grounded rumors that a new Tenite was on the way have been in circulation for several months. The only other admitted manufacturer of propionate molding material is Celanese Plastics Corp. who announced their material late in 1945 but were delayed in getting into production due to construction bottle-

necks. The latter company merchandise their product under the name of Forticel and designate it as cellulose propionate while Tennessee Eastman Corp. calls it cellulose acetate propionate.

The letter accompanying the Tennessee Eastman announcement said that Tenite III has superior impact strength and dimensional stability to Tenite I and has less odor than Tenite II. The company reports that their new product is not compatible with cellulose acetate and only slightly compatible with cellulose acetate butyrate. It has slightly more resistance to organic solvents than cellulose acetate butyrate but less than cellulose acetate. Cellulose lacquers can be used with the harder flows of Tenite III but in the softer flows there is a tendency for plasticizer migration to the lacquer coating.

Table I.—Properties of Tenite III, Formula 300^a

Property	Temp. R.H.		Formula									
	° F.	%	H4	H3	H2	H	MH	M	MS	S	S2	S3
Flow temperature, ° F.	...	...	347	338	329	320	311	302	293	...	...	...
Specific gravity	77	50	1.22	1.22	1.21	1.21	1.20	1.19	1.18	...	...	...
Rockwell hardness	77	50	R115	R112	R107	R101	R94	R87	R80	...	...	...
Elongation, %	77	50	40	41	43	45	48	51	55	...	...	...
Impact strength, ft.-lb./in. notch	-40	...	0.4	0.5	0.5	0.5	0.6	0.6	0.7	...	...	...
	77	50	0.7	0.8	0.9	1.1	1.5	2.1	2.9	...	...	...
Tensile strength, p.s.i.	77	50	5810	5270	4740	4230	3770	3350	3020	...	...	...
	158	...	4330	3800	3290	2830	2450	2180	2000	...	...	...
Flexural strength, p.s.i.	77	50	12,210	10,700	9280	7940	6740	5750	4980	...	...	...
	158	...	9100	7760	6500	5370	4390	3690	3180	...	...	...
Modulus of elasticity, p.s.i. × 10 ⁵	77	50	1.97	1.80	1.64	1.48	1.33	1.19	1.05	...	...	...
	158	...	1.64	1.46	1.29	1.12	0.96	0.81	0.67	...	...	...
Distortion under heat, ° F.			184	172	160	150	141	134	130	...	...	...
Deformation under load, %										...	...	...
(cold flow)	122	...	1	3	4	8	16	29	39	...	...	...
Water absorp. (24 hr. immersion)										...	...	...
Total, %	77	...	2.3	2.2	2.1	2.0	1.9	1.9	1.8	...	...	...
Soluble matter lost, %	77	...	0.1	0.1	0.1	0.1	0.1	0.1	0.1	...	...	...
Accelerated aging, 72 hr.										...	...	...
Weight lost, %	180	...	0.2	0.2	0.3	0.3	0.4	0.5	0.7	...	...	...

^a Formula 300 has high impact strength at both ordinary and low temperatures. Good dimensional stability and a wide temperature range plus minimum odor make this formula suitable for a variety of applications.



by RAYMOND T. MISKELLY*

Nylon rope heads for new markets

MORE than 20 different synthetic filaments have been evaluated so far in rope. Of these, only three—nylon, Saran, glass—have been found to have practical application in the rope field in their present state of development and nylon is easily the most important of these three synthetics.

The Plymouth Cordage Co., Plymouth, Mass., has worked with nylon fiber since shortly after the introduction of this wholly man-made fiber by E. I. du Pont de Nemours & Co., Inc., in 1938. Progress in determining its value in rope was necessarily slow at first because supplies of nylon yarn for rope development were quite limited. During the war, however, important military uses were found—glider tow rope, mountain climbing rope, hammock rope, air pick-up rope and other special applications.

The war need for nylon rope provided the opportunity to gain accelerated experience with its manufacture and extensive information on physical properties. During the latter stages of the war, actual service tests were begun in a number of different types of rope

service looking to definite postwar uses for the product.

This extensive service test program has resulted already in a number of civilian uses in which nylon rope is outstanding and superior to ordinary types of rope in performance and service life. These include nylon yacht rope and anchor line, mooring line, lariat rope, mule spinner ropes, spindle banding and mountain climbing rope. In addition, the use of nylon rope for glider towing and in the air pick-up of mail and freight is continuing into the postwar period.

There are also uses where service requirements suggest nylon but where present nylon rope either does not meet all of the service requirements for various reasons or does not give a sufficient increase in service life to permit use at present prices. Examples of such uses are projectile lines, potwarp, alongside towing lines, torpedo lines and drop hammer ropes.

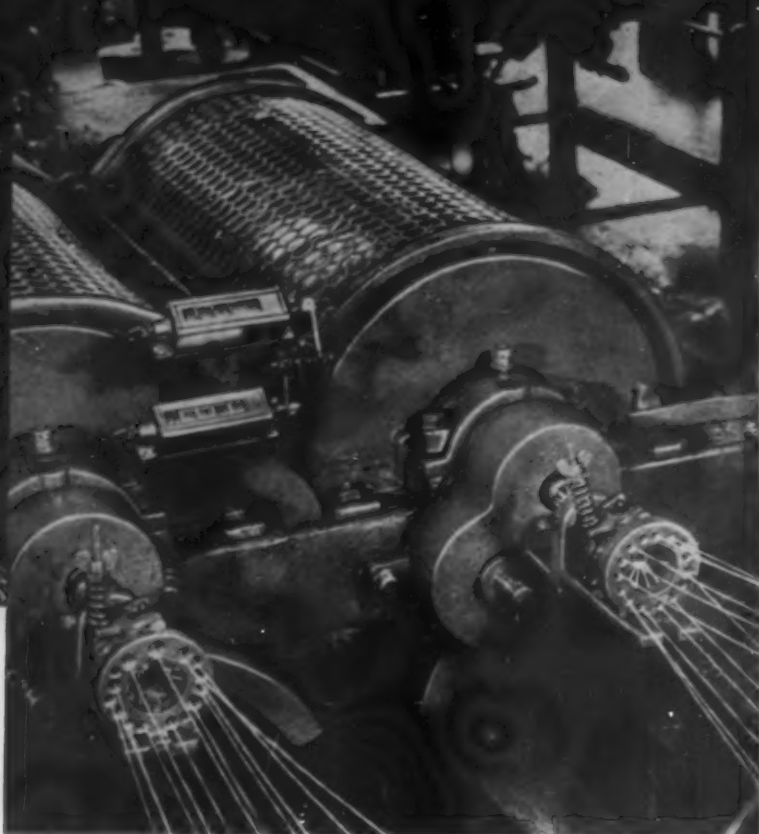
From all experience so far, it is clear that the use of nylon rope is now quite selective. There is no doubt, however, that additional applications will be found where nylon is advantageous but the determination of suitability in each case will require careful consider-

* Director of research, Plymouth Cordage Co., Plymouth, Mass.



ALL PHOTOS COURTESY PLYMOUTH CORDAGE CO.

The throwster's yarn, partially separated here, is actually composed of 68 individual filaments. At right, 12 throwster's yarns are spun into ropemaker's yarn. Number used depends upon size of rope desired



ation of physical properties, performance and cost based on relative service life in comparison with the hard fiber or cotton ropes.

Ropemaking

While the fiber used determines the physical properties of the finished rope to a great degree, rope construction also plays an important part and has a marked influence on performance. The amount of twist put into the yarn, strand and rope, as well as the relationship between these twists, affect such important properties as tensile strength, abrasion resistance, handleability and, to some degree, elasticity.

Several steps are eliminated when making nylon ropes. Fiber blending, fiber cleaning, preparation and lubrication are not needed. However, the remaining three mechanical operations of 1) spinning the yarns, 2) forming the strands, and 3) laying the rope are carried out as in the making of natural fiber ropes and on the same equipment.

The nylon is received in throwster's yarn form ready for spinning into ropemaker's yarns. Plymouth Cordage Co. generally uses a virgin nylon, type 300, of 210 denier, 68 filament. Each size of nylon rope must contain a certain number of denier, all lined up on an established base. Knowing the number of denier required for any given size of rope and the number of denier in the yarns received, it is a simple matter to calculate the number of these throwster's yarns which must be twisted into our ropemaker's yarn. It then requires special care and handling in spinning as these nylon threads behave quite differently from the hard, natural fibers.

The final operations of forming the strands and laying

the rope vary little from normal processes. An entirely new technique, however, was necessary in determining proper lays of rope and twists of strands.

Lack of space precludes any comprehensive discussion of the physical properties of nylon rope, but we can review its more outstanding and important qualities to illustrate what might be expected of this type of rope and to serve as a guide in determining possible application. Keep in mind that rope construction also affects rope qualities. It is not possible to quote figures that will apply generally.

Outstanding properties of nylon rope

Strength—Strength is an important characteristic of all ropes and in this respect nylon rope is outstanding. It is the strongest of the synthetic ropes and has about 3 to 3½ times the strength of cotton rope. It is appreciably stronger than hard fiber ropes, being approximately 1½ to 2½ times stronger than Manila and 2 to 3 times stronger than sisal. The wet strength of nylon rope, however, is about 83 percent of the dry strength and this must be kept in mind in selecting rope size in those uses where wet strength is important.

The higher strength of nylon permits the use of a smaller rope for equivalent strength in services where there are no other limitations on size. The advantages of course, are weight saving and easier handling.

Abrasion resistance—All rope is subject to wear in use. Therefore, good abrasion resistance or durability is desirable. Here again, nylon rope is outstanding, having remarkably high dry-wear resistance as compared with hard fiber ropes. Laboratory and actual service tests show that nylon is considerably better than ordinary fiber ropes under general wear conditions.

It wears somewhat faster when wet but it is still better than Manila. Nylon rope will chafe as will all ropes, necessitating protection from severe chafing.

Elasticity—Nylon rope stretches appreciably when loaded and has high elastic recovery when the load is released. It has much higher working elasticity on repeated loading than any other synthetic or than Manila, sisal or cotton ropes. When first loaded, it increases in length permanently to a degree depending on and increasing with the load applied.

The combination of high stretch, elasticity and strength possessed by nylon results in a rope with high energy absorption and excellent impact strength.

Therefore, in uses where rope may be shock loaded or where good energy absorption is needed—such as mountain climbing rope, glider towing, air pick-up work—nylon rope is superior to other types now available.

On the other hand, there are uses in which stretch and elasticity are objectionable. Such a use is alongside towing. Here, it is important to hold constant the relative position of the tug and the tow. There are also services—such as yacht rope—where high stretch causes no difficulty but is of no advantage.

Resistance to deterioration—Another unusual and valuable property of nylon for rope is its excellent resistance to rotting organisms and marine deterioration. Strength retentions of from 75 to 90 percent have been obtained in tests on nylon ropes after one to two years' use in several different marine services, indicating considerable additional service life. Furthermore, nylon rope is resistant to attack by marine borers in sea water. Since no rot proofing treatment is needed with nylon rope, the user has added advantages in cleanliness, appearance and lower weight. Marine fouling organisms will grow on nylon rope but, apparently, to a lesser degree than with ordinary ropes.

Because of excellent rot resistance, nylon rope will not suffer loss in strength in cases where there is no opportunity to dry the rope after wetting or where it is necessary to put the rope in storage while still damp or wet. However, best practice is to dry nylon rope before long-time storage. Incidentally, strength tests on nylon ropes in storage up to four years have shown no loss in strength.

Used outdoors, exposed to light and atmospheric conditions, nylon rope again shows high retention of strength over long periods in comparison with other fiber ropes. Light has a degrading action on nylon fiber, but the effect of light on rope is less than might be expected. This is because of the relatively small percentage of nylon fiber in the rope on the surface and exposed to light. One nylon rope in continuous outdoor use from May to November lost but 11 percent of its original strength.

Nylon fiber has low moisture regain and water causes no lateral swelling. Nylon rope, therefore, is very little affected on wetting as compared to hard fiber ropes, except for the slight loss in original strength already mentioned. The rope structure absorbs water,

but the increase in weight with nylon is much less. Slight hardening takes place when nylon rope is wet, but this is taken care of by adjusting the rope construction so that rope handleability is practically the same wet as dry. There is no swelling when wet.

Handling and size of nylon rope

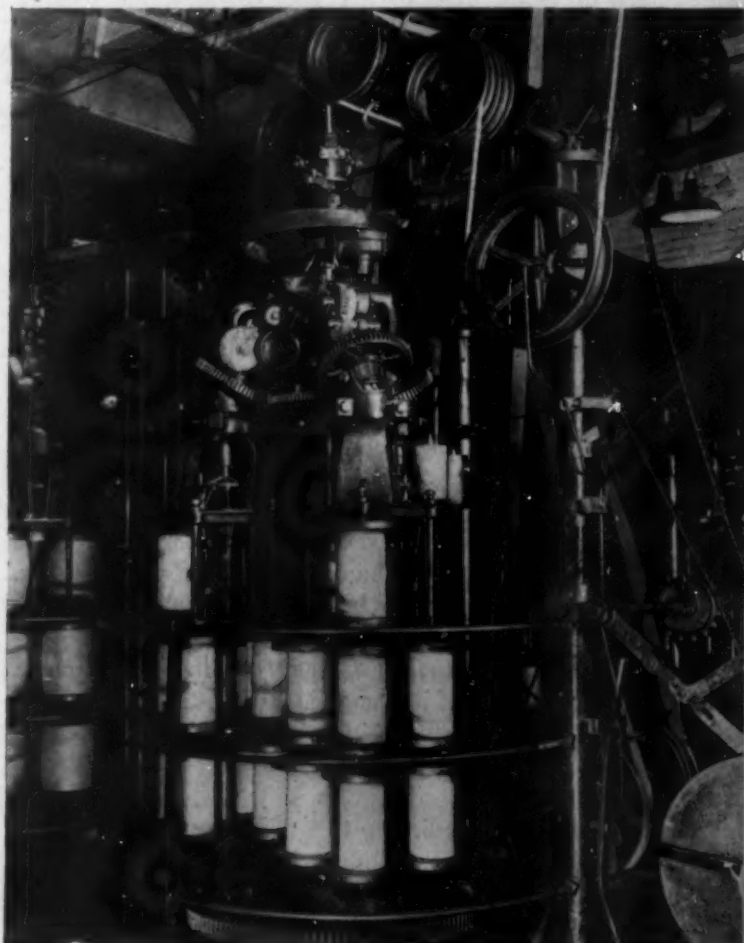
The surface of nylon rope is smooth and somewhat slippery, more so than with hard fiber ropes. Because of this, many have questioned the spliceability of nylon rope and the efficiency of the splices. Considerable experience has shown that nylon rope can be easily spliced, using the usual splicing methods.

Large nylon ropes have been made, the largest so far being a 9-in. circumference cable made during the war for towing and mooring use. This cable had a strength of about 115,000 lb., which is approximately equivalent to a 13-in. circumference cable-laid manila rope or a 15-in. circumference cable-laid sisal rope. The 880-ft. coil weighed 1908 pounds.

Future of synthetics

While there is no doubt as to the superiority of nylon rope in the uses developed so far, in most cases, no final statements can be made yet on actual service life relative to hard fiber or cotton ropes.

A standard compound former-layer is seen here. It first forms three strands, then lays these into finished rope





The WHY and HOW of dyeing plastics

The dyeing of plastics makes possible coloring of sections of an article as in the case of these auto parking lights. Problem in this piece was to prevent dye from creeping along grooves into clear sections. The solution was found in stopping the grooves where dye was to stop

phenolic. Although the dye has been used successfully on polystyrene, the dye manufacturer does not recommend it.

Tinting for pastel shades

The artificial flowers produced by Curry Arts, 514 Broadway, Scranton, Pa. (page 126), offer an example of how this cold-dip dye can be effectively used. These Plexiglas flowers, after being formed with heat and given a slight sandblasting, are dipped in the dye for a few seconds to obtain the delicate pastel shades of the petals. Dyeing is done by placing parts on tray and dipping the tray for the desired time. Since shading of color is important, only a dozen or so petals are dyed at a time so that they may be watched carefully.

After dyeing they are of course rinsed immediately in cold water and then allowed to air dry. Stems and leaves that require a darker color are dyed in greater mass and left in the dye for a long period. If a two-tone effect is desired, the flowers are slightly sandblasted again at various places and this blasting makes the color appear slightly darker in the grooves in contrast with the lighter all-over shade.

Use of a concentrate dye

In contrast to the flower fabricator, whose chief aim is to get delicate transparent shades, a manufacturer of automobile parking lights must obtain a uniform dark red color in the lights in order to conform with state traffic regulations which specify the intensity of color required. To conform with these regulations, Mittan Mfg. Co., 2310 Third Ave., New York City, uses the Rez-N-Dye in concentrate form.

The two parking lights made by this manufacturer, the clamp-on and the drill-on models, are simple units which can be attached to front or rear auto fenders to provide an inexpensive parking or running light. A

WHY dye plastics? Aside from the obvious reason of being able to get the exact shade desired through dyeing, there are many other advantages. There is no limit to the colors available. Two colors can be used instead of one. If a color goes out of style the dye may be removed with a cleaner and the object redyed, or the dye may be left and the product redyed with another color to get a third color. But the greatest advantage in the dyeing of plastics lies in the fact that fabricators need not carry a vast stock of different colored plastic materials and possibly have odds and ends of colors left over after a job is finished. Molders, who must buy molding powders by the barrel for economy's sake, are not faced with the storage problem of countless barrels or the problem of what to do with leftovers of various colors that are too small in quantity for economical runs.

For those molders and fabricators who must dye plastics, the chief problem has been the finding of a simple dye that could be used on all plastic materials. A number of companies have found the answer in Rez-N-Dye,¹ a non-toxic cold-dip dye that requires no dilution or heating to impart a clear, transparent color. Dyeing consists of immersing an object in the dye for a short time and then rinsing with water. The intensity of the resulting color depends upon the time of immersion—an instant dip gives soft pastel shades while darker shades require up to 3 minutes. The Dye may be used on acrylic, cellulose acetate, cellulose acetate butyrate, cellulose nitrate, ethyl cellulose, vinyls, some

¹ Product of Schwartz Chemical Co., Inc., 326 W. 70th St., N. Y. C.



The button industry makes extensive use of cold-dip dyes to achieve mass coloring in a matter of seconds. It has been found that this dye takes evenly, does not cause the buttons to stick together, will not remove surface sheen



Cold-dip dye is used in stripes on such items as vinyl belts to give eye-appeal. Used thus, it is applied to the underside of the plastic by a striper machine. Several colors may be used thus but each must be applied separately

block of Lucite is the means by which light is reflected from a $\frac{1}{4}$ -ampere bulb. This block is grooved around the edges to help light reflection in the acrylic. Only one end of the acrylic block is red, that which will face the rear of the car—the other end is left clear. There can be no trace of red or pink running into the clear side of the acrylic; therefore, the line of dyeing must be true.

Mittan Mfg. Co. has set up an inexpensive assembly line for dyeing which produces as many as 260 dyed acrylic blocks an hour with only one pair of hands doing the dyeing. Twenty-four acrylic blocks are clamped in a jig which is turned upside down and lowered so that one-half of each block is immersed in dye—the level of the dye indicating the proper demarcation of clear and dyed parts. Dyeing time is from 3 to 5 sec. and a little agitating is necessary to keep bubbles from forming. Rinsing is eliminated when, as in this case, the concentrate dye has been used—a factor which naturally speeds up production.

In dyeing the acrylic blocks the manufacturer first ran into trouble because the light reflector grooves were extended completely around four sides of the block. When dye was applied it had a tendency to creep up the grooves and extend into the part of the block which was required to be clear. While experimenting in ways to control the creep, the company discovered that rising temperatures make the dye creep up the grooves and low temperatures (down to about 40° F.) would stop this action. The light manufacturer, however, was interested only in eliminating this phenomenon without fussing with temperatures. It was finally accomplished by stopping the grooves where the dye was to stop and continuing them at a $\frac{1}{8}$ -in. distance from the dye line.

Further fabrication of the acrylic light piece—the drilling of a hole for the electric bulb and rivets and milling to the dimensions of the metal assembly—is done after dyeing. Many authorities on the subject would

advise against such a procedure because extra handling may lead to scratching the acrylic surface. But here, again, the manufacturer adopted this procedure to keep the dye from creeping around the edges of the hole. Incidentally, this fabricating has not caused surface scratches and the company believes a lot of fabricating could be done after dyeing. The driver using one of these auto lights need have no worry about the dye washing off since it has penetrated the acrylic block as much as 0.005 of an inch.

Coloring vinyl

By coloring Vinylite belts and wrist watch straps, Krasnow Co., 205 E. 18th St., New York City, puts additional eye appeal into its merchandise. Some items are given an all-over tint with cold-dip dye to obtain a clear, lustrous finish. Other items, belts in particular, are decorated with colored stripes applied with a striper machine.

Concentrate dye is used in the striper machine and the color is put on the underside of the belt. It is possible to apply as many different colored stripes as desired but each must be applied separately.

Mass coloring of buttons

The button industry is an outstanding example of a field that has benefited greatly from the use of cold-dip dyes. Using cold dyes, buttons can be mass dyed in a matter of seconds. Thousands of buttons can be put in a wire basket, dipped in the dye, stirred once or twice with a stick, rinsed in a tank of water, and dried in an oven or spread on a shelf to air dry. The dye takes evenly on all the buttons, does not cause them to stick together and will not remove surface sheen.

Brite Plastic Co., 56 Suffolk St., New York City, dyes acetate, cellulose nitrate, cast phenolic, and acrylic by the cold-dip method described above. The acrylic,



Artificial flowers show the soft graduated effects that can be achieved with cold-dip dyes. After forming, flowers like these of acrylic, are sandblasted, dipped, rinsed in cold water and allowed to dry thoroughly in the air

cellulose nitrate and acetate buttons are left in the dye for the same amount of time but cast phenolic buttons, because of their harder surfaces, must be left in longer.

Cold-dip dyes do not coat the plastic surface in coloring but swell the surface so that the dye penetrates. As soon as the rinse is applied, the plastic shrinks back to its original dimensions, trapping the color beneath

its surface. Hard-surfaced plastics are, therefore, difficult or impossible to dye. With cast phenolic the Brite Co. leaves buttons in the dye about three times the average dyeing time and then only gets a pastel. Thermosetting plastics that are non-absorbent, non-fusible and non-soluble cannot be colored by cold-dip dyes.

Color fastness

In general, Rez-N-Dyes show excellent light stability on all plastic materials. However, the fastness of the dye is related to the plastic itself or a component or plasticizer used in the plastic. For instance, in testing for color fastness, the dye manufacturer placed cellulose acetate, acrylic and cellulose nitrate on the roof for a period of 10 weeks during the summer. Half of each plastic piece was masked off so that light could not reach that part. At the end of the test period, the exposed part of the cellulose acetate piece was unchanged as to color, the exposed acrylic had become lighter in the shade of color, the exposed cellulose nitrate had lost its color entirely.

Various methods of application

The ease with which the dye can be applied and the variety of dyeing methods that can be employed have added greatly to its popularity. It has already been seen that the concentrate can be applied by dipping or by striper machine. It can also be applied by hypodermic needle, brush or medicine dropper when it is necessary to get dyes into parts such as might be found on the decorative patterns for cigarette boxes and novelty items. One manufacturer of advertising signs whose plastic signs are too large for usual dyeing methods applies the dye by spraying it on with a hose and then spraying water by the same means as a rinse.

AN ANALYSIS OF THE FCC ORDER legalizing the use of industrial high frequency heating equipment has been prepared by Paul D. Zottu, chairman, S.P.I. Frequency Allocation Committee and is in S.P.I. Bulletin No. 263.

Under the new rules this equipment may operate with or without a license. Within these frequency bands, station license is not required:

Assigned band	Center frequency of channel	Band width of channel (from center frequency)
mc.	mc.	kc.
13.6525-13.6675	13.66	± 7.5
27.160-27.480	27.32	± 160
40.960-41.000	40.98	± 20

Spurious and harmonic radiations must not exceed strength of 10 mc. per meter at a distance of one mile or more from radiating equipment.

A dated certificate setting forth conditions under which equipment should be operated and giving a guarantee of at least three years is required. If the Commission has reason to believe that operation is inconsistent with provisions set down or is a source of interference to radio communication, renewal of certification may be required.

A station license is not required for operation outside the frequency bands provided it is in accordance with general conditions of operation set out in the certificate. However, equipment must be operated so that omissions of radio-frequency energy generated by such operation, including spurious and harmonic omission will not exceed a strength of 10 mc. per meter at a distance of one mile from industrial heating equipment on unspecified frequencies.

A license is required for equipment which does not comply with above provisions.

A high heat resistant polystyrene

by RALPH I. DUNLAP, JR.,
and SANFORD E. GLICK*



ALL PHOTOS AND CHART, COURTESY MONSANTO CHEMICAL CO.

THE PLASTICS industry has long exhibited interest in a low cost, high heat resistant thermoplastic molding material. Recognizing this fact, the Plastics Div. of Monsanto Chemical Co., Springfield, Mass., has developed a modified polystyrene (Lustrex) with a heat distortion point of 87 to 88° C. (air bath) as compared to a heat distortion point of 78 to 80° C. for standard polystyrene. However, in most applications this new material has been found to withstand actual boiling for periods long enough to provide safe sterilization for most products.

In addition to possessing the higher heat distortion point, Lustrex has improved physical and molding properties. The flexural strength is 12,000 to 14,000 p.s.i. as compared to 10,000 to 12,000 p.s.i. for standard polystyrene. The flexural deflection in inches is 0.15 to 0.25 as compared to the standard 0.09 to 0.12. The impact strength has been raised to 3.2 to 3.6 ft. lb. per in. (unnotched) as compared to 2.2 to 3.5 in standard material. Molding cycle reductions of as much as 30 percent have been realized.

Effects of Heat

In a test of applications in existing molds the new material has been found by the manufacturer to be superior to standard polystyrene in many ways. Standard polystyrene spoons distorted badly and curled up after 10 min. boiling; modified polystyrene ones evidenced no apparent change in dimensions after 1 1/2 hr. of boiling. In a comparison of molded tea strainers the regular material distorted badly after 6 min. while the new material was unchanged in the same period of time. On

cutlery handles molded of the modified styrene, there was no distortion after 20 min. boiling.

A dry heat comparison test was made on battery cases in which regular polystyrene failed after 1 hr. at 175° F. A modified polystyrene case was subjected to successive hours at 170, 180, 190, 200 and 210 °F. After the sixth hour (at 220° F.) this case started to distort.

Although this modified polystyrene can be boiled in a number of applications, it does not necessarily apply that it can be boiled in all instances. Development work has shown that boilability will depend on thickness of the piece, the position of the gate or gates and the concomitant strains set up in molding. By making the piece sufficiently thick and minimizing the strains,

The outstanding characteristics of this modified polystyrene include: Increased heat resistance and improved toughness as compared to standard polystyrene, low price, wide color range, excellent electrical properties, faster molding cycles, low water absorption and freedom from odor and taste.

* Research group leader and technical service representative, respectively, of Plastics Div., Monsanto Chemical Co., Springfield, Mass.



Informative labeling is an integral part of the materials manufacturer's plans for the promotion of this new high-heat resistant polystyrene. Labeling is especially important for parts molded of this material because only by boiling can they be distinguished from standard polystyrene

various shaped moldings of Lustrex can be made to resist boiling for periods up to and exceeding 1 hour. Thicknesses of $\frac{1}{8}$ in. or more usually are helpful in realizing the full potentialities of this material. Although no visible distortion takes place while Lustrex is being boiled, some colors have a tendency to lighten considerably after immersion for prolonged periods. This difficulty which generally occurs only in light transparents or very dark opaques, is now being studied.

The added heat resistance and toughness of this modified polystyrene also brings it closer to Underwriters specifications than standard polystyrene. For example fluorescent tube holders molded of standard polystyrene fail after 16 hr. continuous exposure at 159° F., when a 12-oz. load is supported by two fixtures. In an identical test, with the same load, Lustrex performed satisfactorily for the same period of time at 203° F.

In addition, this modified polystyrene has been tried with marked success as insulation for condensers, transformers, resistors, for wall plug attachment caps, receptacles and connectors, battery cases, switch plates, radio cabinets. It is anticipated that a large percentage of the production of the new material will be applied to these uses. The properties required in a finished product should, however, be carefully considered so that the new high heat resistant polystyrene will be used to advantage where the 5 cent per lb. price differential is justified.

Molding differences

In addition to the improved heat resistance, the added toughness and the faster molding cycles resulting from this modified material are of importance. The greater toughness over the regular material varies from 10 to 50 percent depending on the property measured. For those applications where polystyrene is just on the borderline for toughness the new material will generally provide the required increment. Because of its tendency to set up at a higher temperature than polysty-

rene, it is possible to reduce the injection molding cycles by as much as 30 percent, depending upon the job. The speed-up in molding cycles will, in most cases, offset the slight added cost of the material.

In some instances where the pieces are thin and the molding cycles for standard polystyrene are in the range of 10 to 15 sec., no improvement in molding cycle time is noticeable. However, for molding thicker sections such as combs, cutlery handles, battery cases or other items of approximately the same thickness, molding cycles have been reduced as much as 30 percent.

Since the modified polystyrene has somewhat harder flow than regular polystyrene it is usually necessary to employ slightly higher heats. Depending on the job being run, temperature increases of 20 to 60° F., are required. However, in a number of instances in field tests in molders plants, it has been possible to employ the same heats and pressures as normally used for polystyrene. On a few occasions in these field tests it has been necessary to raise ram pressures by about 10 percent.

Wall sections on pieces molded from the new material can be the same as those for polystyrene. However, if molds are being designed for this material it is advisable to thicken the pieces as much as economically feasible.

Because of the material's additional toughness, occasionally a more fibrous cut is produced upon degating. However, this offers no serious problem since the molded pieces can be degated at somewhat higher temperatures immediately upon removal from the die.

Potentially, an unlimited color range is possible with this high heat resistant polystyrene. At present, because of a slight yellow haze in the material and limited production facilities, it is being produced only in a limited range of translucent and opaque colors. Eventually it will be available in same colors as Lustron.

This new material is the first high heat resistant thermoplastic to be produced without copolymerization. While in some respects it does not possess the qualities of styrene copolymers it has advantages over the latter.

Table I.—Properties Chart

Property	Standard polystyrene	Lustrex ^a	Cerex 207 ^b
Molding quality	Excellent	Excellent	Excellent
Injection molding temp. °F.	300-500	300-500	340-550
Injection molding pressure, p.s.i.	10,000 and up	10,000 and up	10,000 and up
Specific gravity	1.05	1.05	1.065
Flexural strength, p.s.i.	10,000-12,000	12,000-14,000	12,000-14,000
Flexural deflection, in.	0.09-0.12	0.15-0.25	0.15-0.25
Impact strength, ft. lbs. per inch (unnotched)	2.2-3.5	3.2-3.6	3.0-3.5
Heat distortion temperature, ° C. (air bath)	78-80	87-88	101-103
Dielectric constant, 1 megacycle	2.45-2.65	2.5-2.7	2.67
Power factor, 1 megacycle	0.0001-0.0003	0.0001-0.0005	0.0012
Water absorption, % 24 hr.	0.03-0.04	0.04-0.05	0.21
Chemical resistance	No effect from weak acids and bases or strong bases Strong oxidizing acids attack		
Solubility	Soluble in esters, aromatics, higher alcohols, chlorinated hydrocarbons	Soluble in aromatic and chlorinated hydrocarbons	
Clarity	Crystal transparent	Slight yellow haze	Light amber transparent
Color possibilities	Unlimited	Almost unlimited	Extensive

^a New polystyrene molding material produced by Monsanto Chemical Co.

^b A high heat resistant copolymer of polystyrene produced by Monsanto Chemical Co.

The following applications of this new modified polystyrene have been successfully tried or are contemplated:

Strainers molded of this high heat resistant polystyrene have advantage of being able to withstand sterilization

PHOTO. COURTESY CHICAGO IMPRESSION DIE & MFG. CO. AND PLASTIC METAL MFG. CO.



Household merchandise

Food, tea strainers	Kitchen utensil components
Combs, brushes	Tableware
Stove handles, knobs, plates	Buttons
Baby feeding dishes, mugs	Lamp shades
Thermos bottle cups, caps	Shower, faucet nozzles

Surgical and medical appliances

Instrument, brush handles	Hypodermic syringes
Body cavity pipes	Diaphragm insertors
Thermometer cases	Tongue depressors

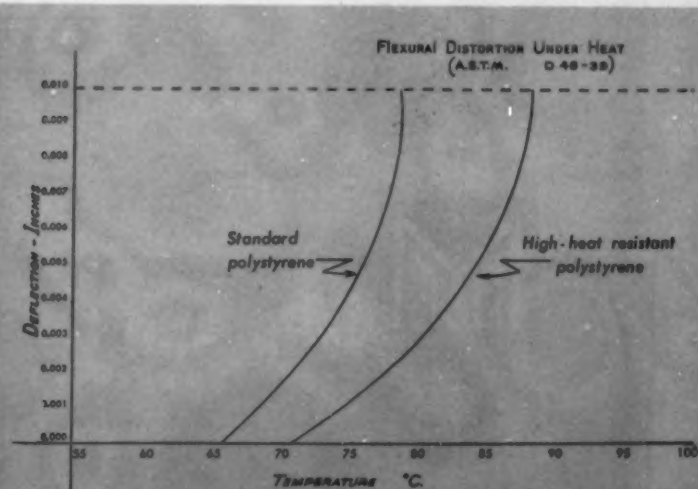
Industrial Items

Milking machine parts	Clock, instrument parts
Plating masks	Toilet seats
Automotive lenses and trim	Textile equipment parts
Oil cups	Dome light shields
Small motor housings	Soda fountain equipment

While the assistance of technical service men can be readily obtained from the material's manufacturer in preparing for a run with this new material, or when problems are encountered, the materials manufacturer considers it even more essential that this service be supplied when new molds are under construction and it is contemplated using this material. Here the correct wall thicknesses and the proper positioning and size of the gates can assure the realization of the peak of the material's properties.

Lustrex is an excellent argument for the necessity of informative labeling. There is no way, short of a boiling test, to identify items made from this material from those made of standard polystyrene. The characteristic ringing sound with which polystyrene is identified is present in this new material in the same degree. For this reason Monsanto Chemical Co. is arranging with molders who are purchasing this material for informative labeling. As an example, the Plastic Metal Mfg. Company of Chicago, Ill., is employing a cardboard label which slips over the arm of tea strainers which are being produced (see page 128). Similar labels will appear on other items molded of this material.

The flexural distortion under heat, of standard and high heat resistant polystyrene, are presented in this chart



The largest hobbing press in the plastics industry

now producing:

**Hobbed Cavities
by Midland...**

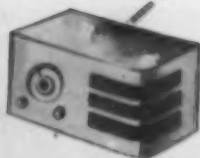
An important addition to Midland's expanding facilities is this 8000 ton hobbing press, the largest of its kind in the plastics industry.

This mammoth press with a ram diameter of 39½ inches makes it possible for Midland to hob cavities of approximately 80 square inches . . . almost tripling former hobbing limits.

With this press, Midland is prepared to supply plastic molders with hobbed cavities for large plastic parts including radio cabinets, large container escutcheons and instrument housings. Multiple cavities can be hobbled . . . "like peas in a pod" . . . quickly, with complete uniformity and accuracy. Multiple cavities will speed up your production with a minimum of expense.

Midland experience and facilities, in addition to skilled craftsmen, are ready to serve you . . . to produce the finest and deliver on time when you specify "Hobbed Cavities by Midland."

Write for your copy of "How to Heat Treat Hobbed Cavities," a practical heat treating treatise to help you get the best performance from Hobbed Cavities by Midland.



Cavities for:

Radio Cabinets



Escutcheons



Instrument Housings



MIDLAND DIE AND ENGRAVING COMPANY

1800 W. BERENICE AVENUE • • • CHICAGO, ILLINOIS

Makers of Plastic Molds • Die Cast Molds • Engraved Dies • Steel Stampings • Hobblings • Pantograph Engraving

Plastics Engineering

F. B. STANLEY, Engineering Editor

Molding phenolic parts of target gun

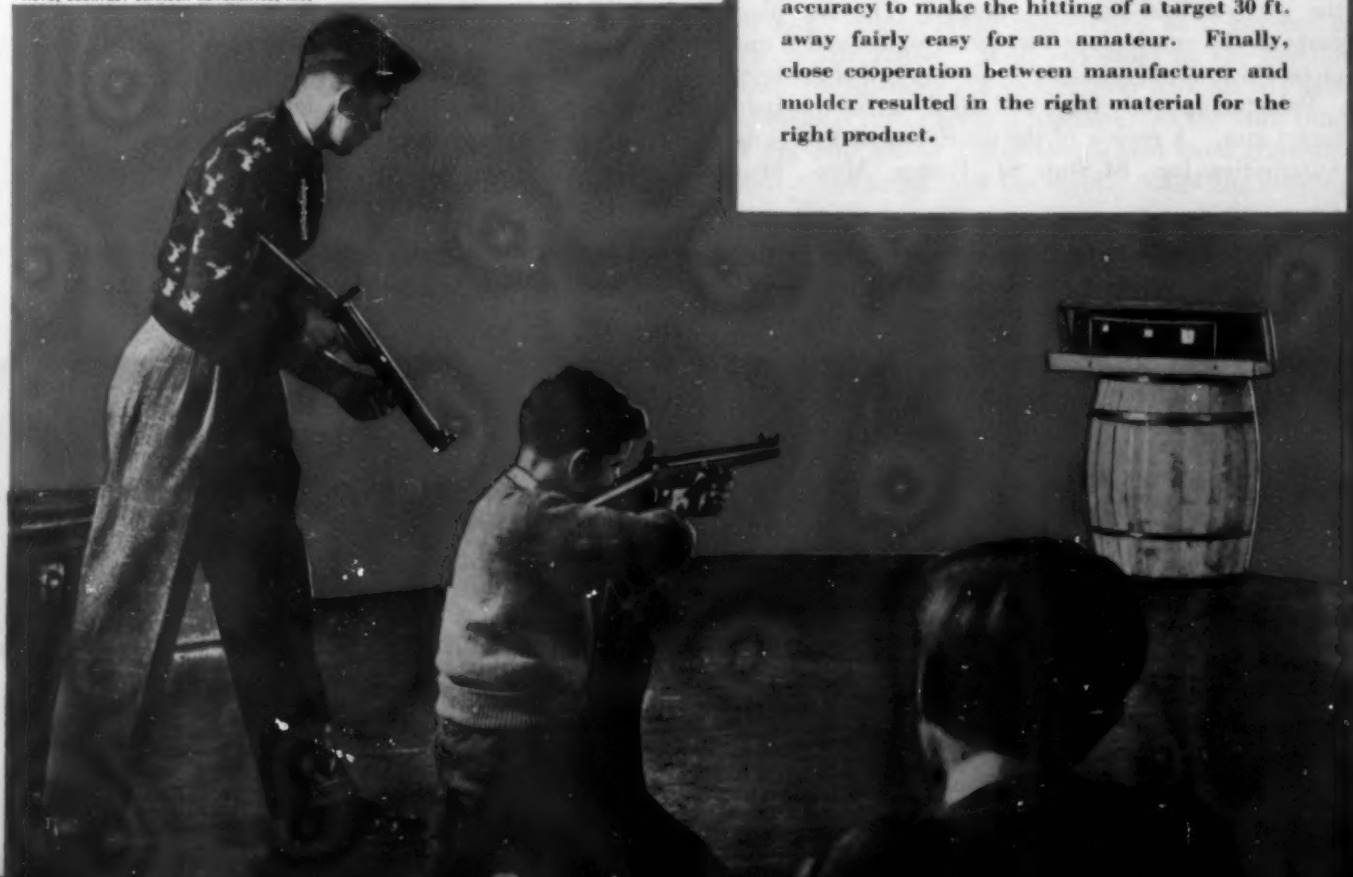
THE AIR rifle has at last been eclipsed by a gun which is not only more accurate but at the same time is far less dangerous in the hands of a wild and wooly youngster. The projectile of this new gun, a small unfinished ball bearing approximately 0.176 in. in diameter—similar to the standard B-B—will only sting if the gun is discharged directly against or very close to the body. It may be discharged inside the house without causing damage unless a direct hit is made on the most fragile china or glassware. This is because the muzzle velocity of the projectile is only 90 to 100 ft. per second.

Even so, this indoor target gun has a phenomenal accuracy up to a distance of 30 feet. It is possible to take the average production gun and fire five shots inside the $\frac{3}{8}$ -in. X-ring of the $\frac{3}{4}$ -in. bull's eye on a standard paper target at a distance of 15 feet. In a standing

* Reg. U. S. Patent Office.

When the idea of a safe and accurate indoor target gun was conceived, a considerable amount of research was conducted to determine the best material to use for the various parts of the gun. Intricacy of shape, weight, cost and precision were prime considerations. For three of the important parts, phenolics were found to meet all requirements. A gun with these three parts molded of plastic proved light enough for even a small boy to handle easily. And the two hand grips would not have been practical if they had been produced in any other material. Use of wood, for example, could have proved too expensive because of the more costly production methods and the waste which was involved. Too, the phenolic could be molded with sufficient accuracy to make the hitting of a target 30 ft. away fairly easy for an amateur. Finally, close cooperation between manufacturer and molder resulted in the right material for the right product.

PHOTO, COURTESY JOHNSON AUTOMATICS, INC.





2—Phenolic was considered ideal material for three important parts of this target gun. Two of these may be seen here—the butt plate and the stock, including hand grips

3—The top piece, of metal, has been raised here in order to show the third plastic part. This is transfer molded phenolic pellet carrier



3 PHOTOS 1 THROUGH 11, COURTESY PLASTIC MANUFACTURERS, INC.

position an expert has made 20 consecutive hits on the $\frac{1}{8}$ -in. steel spinner target that is provided in the set with the gun. It is even possible to light a kitchen match held at a distance of 10 to 12 ft. from the gun.

Three phenolic parts

Phenolic was considered the ideal material from which to produce three important parts of the gun. The entire stock, hand grips and complete lower portion of the gun, except for the butt plate, is a one-piece transfer molded phenolic part. The butt plate, molded in the same mold, is later assembled by means of thread-cutting screws. The third plastic part is the pellet carrier which is an intricate transfer molded piece. If wood had been used to produce the stock in one piece, great waste would have resulted from getting the necessary depth for the hand grips. Plastic alone could produce the grooves and handles cheaply. The non-plastic parts of the gun include two metal sights and a metal piece which would normally be the top half of the barrel.

Painstaking study went into the design of this indoor target gun. A review of the development by Johnson Automatics, Inc., 84 State St., Boston, Mass., proves

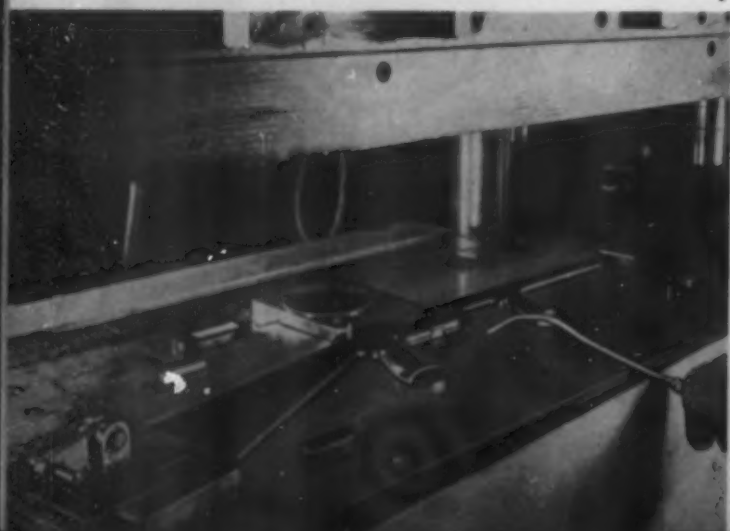
that a better new product is obtained when a group of requirements are first set up and then strictly adhered to.

Near the end of the war, M. M. Johnson, Jr., president of the company, decided that there was a market for a type of gun which could be fired by anyone under any condition without inflicting death or serious bodily injury. At the same time, he felt that this gun should have the highest possible degree of accuracy. For this reason, fully adjustable front and rear sights which could be readily used for lateral as well as vertical adjustment were required. An asset to the company was experience gained from research and development work during the war for the National Defense Research Committee, Army and Navy Ordnance. This work ranged from caliber .30 automatic weapons up to 20 mm. aircraft cannon.

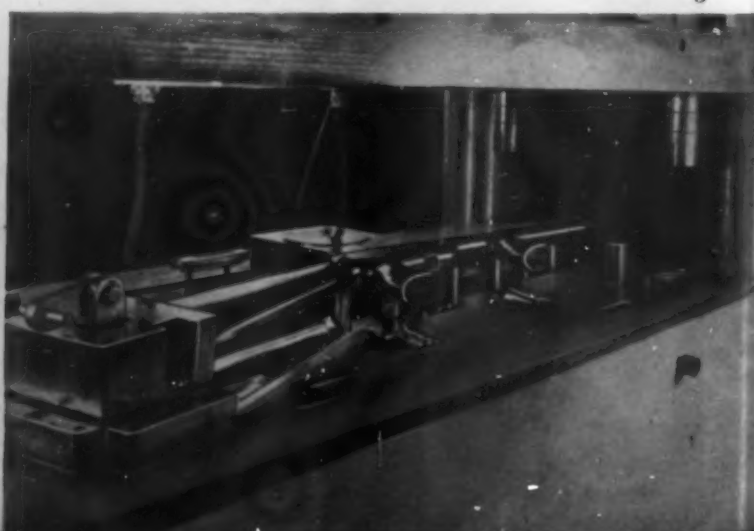
Before the final design of this new target gun was approved, research went through all the various type spring-actuated as well as air-actuated guns. These were eliminated partly on grounds of danger and because of the restrictive legislation in many states. A high powered air gun can be more dangerous than a .22 caliber rifle because the public considers the rifle a real

- 4—The mold for the gun stock has been partially opened so that the operator may blow out excess flash.
5—With the mold completely opened, gun stock and loose mold parts have been raised up by knockout pins

4

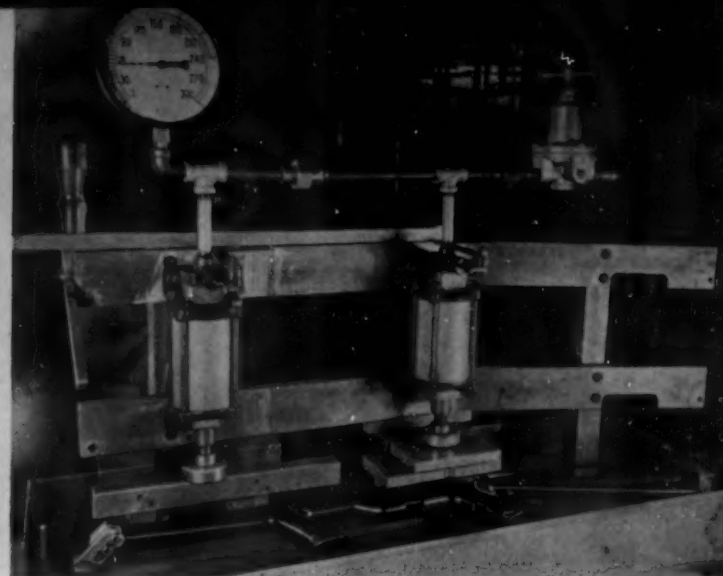


5





6



7

6—Here, an operator makes use of a band saw to remove the major portion of the gate. 7—Two air cylinders are used to impart required pressure for holding gun stock straight while it is in process of cooling

weapon but commonly thinks of an air gun as a toy.

The biggest problem was to get a high degree of accuracy in a gun which did not have a rifle's barrel. Maximum accuracy in the average rifle is the result of rotating a shaped projectile. Ball bearings of 0.176 in. in diameter propelled by surgical rubber tubing were found to give a high degree of accuracy. A velocity of 90 to 100 ft. per second, which would cause no more than a sting, was adequate. The next requirement was a pellet carrier which would hold the pellets in place regardless of the angle of the gun. In the phenolic carrier which was approved, the surgical tubing is engaged with the carrier at all times. As the carrier is drawn back to the trigger during the cocking operation, the pellet is automatically placed in its loading seat in the carrier and at the same time the carrier is locked in the armed position by the trigger. Pressing the trigger releases the carrier and allows the pellet to drop into its discharge seat. The carrier then shoots forward along its track and discharges the pellet as the rubber tubing decelerates the carrier.

The final design model of the gun was equipped with a wooden stock. This wooden stock along with working

drawings of the unit was submitted to Plastic Manufacturers, Inc., 280 Fairfield Ave., Stamford, Conn., for redesigning to a part that could be successfully molded.

Three molds used for gun parts

The engineering department of molder, in cooperation with the engineers of the gun company agreed upon a final design and three transfer molds were produced. Two molds were designed which each produce a complete stock as well as a butt plate. The third mold was for the phenolic carrier. The hollowed-out gun butt necessitated the use of a removable core part which is taken out of the mold and then withdrawn from the butt portion of the stock.

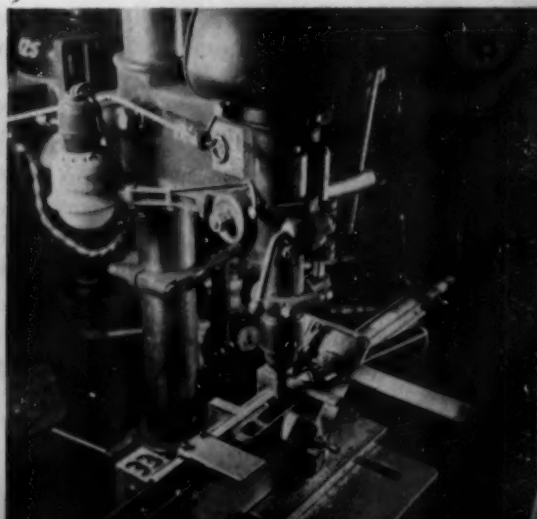
The intricacy of the gun stock and butt plate molds as well as the large number of knock-out pins required to raise up the various movable mold parts can be seen in Fig. 5. A lever which is used as a hand grip can be seen at left center. With the mold in the position shown, the operator grasps this lever with his left hand and raises it into a vertical position. At the same time, the operator grasps one of the molded hand grips and removes the parts from the mold. All of the molding

8—All gun stocks are carefully checked for dimensional accuracy by means of jigs equipped with micrometer indicators. 9—The final accurate gate removing operation is performed in this automatic milling setup

8



9





10



11

10—To drill three holes in the gun stock, a combination drill jig and fixture is employed. 11—The butt plate is assembled to the stock with thread cutting screws which are driven in by two air motors

surfaces of this mold were hard chrome plated in order to insure the best possible surface finish of the completed molded part.

Molding the gun stock

Three preforms of Durez cotton flock filled phenolic, weighing a total of 2.225 lb., that are required for the molding of the stock and butt plate, are preheated by high frequency for 45 sec., at which time the pills begin to smoke. With a mold temperature of 330° F., a total transfer and cure time of 2 min. and 35 sec. is required. Adding to this cure time the time required for opening and closing the mold and for scavenging, the total cycle for the molding of the stock and butt plate comes to approximately 4 minutes.

Conveniently located beside the press is a band saw with which the molder cuts away the biggest portion of the gate from the molded gun stock part. Fig. 6 shows this band saw setup. The operator places a portion of the stock against the guide plate as shown at the right and by sliding the stock from left to right, gets a straight and uniform cut. Later a milling operation removes the balance of the gate and machines a groove inside the stock.

The molded stock part is immediately placed in a cooling fixture, as shown in Fig. 7. It required days of experimentation before this fixture was adjusted to perform its job. Two air cylinders are used to raise and lower the movable portions of the clamping blocks and impart the required pressure for holding the gun stock in shape while it cools. These cylinders, coupled with a flat plate at the bottom of the fixture, control the left or right distortion of the part. A movable and adjustable clamp presses on the bottom of the front end of the stock to control the up and down warpage of this end of the part. In order to speed up this chilling operation, bottom plate is submerged in cold running water.

The gun stocks are next taken to the inspection department where they are gaged for straightness with

two checking fixtures. One fixture (Fig. 8) makes use of two micrometer indicators which check the up and down warpage of the barrel end of the stock. The maximum permissible difference in level between the two micrometer indicator locations has been set at 0.032. Any additional warpage above this 0.032 would cause the metal portions of the gun to bend when they were being assembled.

Assembly of gun parts

All the molded parts—the butt plate and carriage as well as the stock—are next sent to plant No. 2 of this company where all finishing operations are performed. Figure 9 shows a milling setup for removing portions of the gate on the gun stock that were left after the initial rough cut and for accurately cutting a groove in the inside of the stock. The holding fixture for this setup is unique in that the travel is actuated by an air cylinder. The stock is clamped in position and the milling cutter lowered to its correct location, after which the operator causes the stock to travel from right to left at a predetermined rate of feed by merely operating an air valve. Three holes must be drilled in the gun stock. The engineering department of the molder has produced a combination drilling jig and fixture for this job. Figure 10 shows the stock mounted in position in its fixture with the operator's hand grasping an air-operated high-speed drill. This drill operates at an angle of about 30°.

After the third hole is completed, the operator withdraws the drill. Due to the fact that this drill is mounted on a hinged plate, it is possible for the operator to swing the drill back and make use of the larger vertically cutting drills. Both larger drills, one at the left and one at the right, are operated simultaneously by air cylinders.

Because of the fine finish obtained on this molded part, no buffing or polishing is necessary. Only a quick wipe with a soft rag is needed before parts are packed for shipment.

Friction cutting of plastics

by H. J. CHAMBERLAND

WITH continual development of new types of plastics which can be fabricated, technicians have had to find new ways of cutting these plastics efficiently. The introduction of the high velocity technique a few years ago had a great effect in speeding the fabrication of plastics by the band saw method. With the recent application of the friction sawing technique—common to the metal industry—for the cutting of ceramic plastics,¹ still another advance has been made.

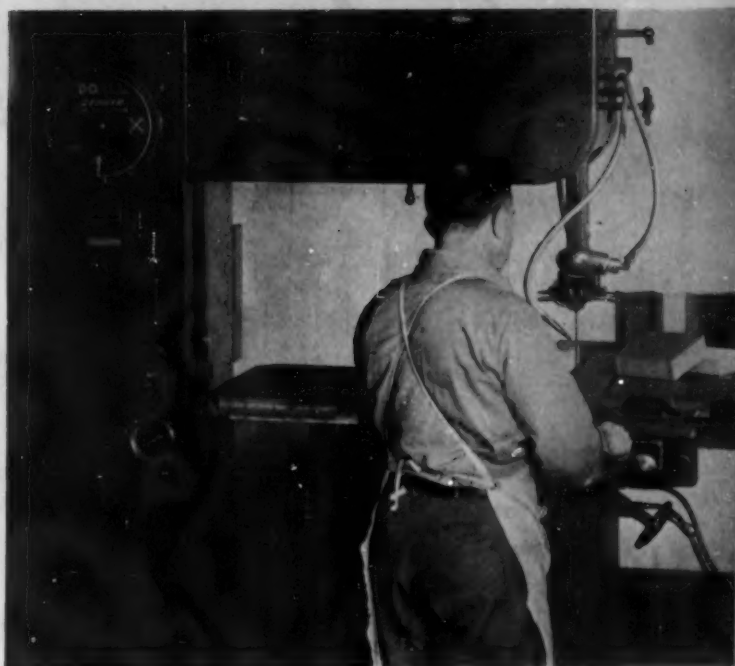
Primarily, it should be understood that high speed sawing and friction sawing are two distinct methods of separating materials. The high velocity technique is simply an improved form of sawing within the low or conventional speed range. Saw speed must decrease with any substantial increase in material thickness and the fundamental rule of chip production that friction generates heat and heat destroys temper cannot be ignored. Thickness of a plastic or other type of material is limited only by capacity height of the machine and heat must be kept at a minimum by applying the proper saw control factor in each instance.

When sawing highly abrasive plastics at low speeds, even the highest grade of hardened tooth blading is of short duration. Thus, the high velocity technique so effective on most plastics is obviously out of the question. Friction sawing is unquestionably the solution and results prove that increased saw life, lower tool cost and high cutting rates more than compensate for method's main fault—material thickness limitation.

When friction sawing, the hardness of the material is of no consequence because the band, which often revolves at 3 miles per min. when cutting steel, softens the material directly in front of the saw teeth through friction from work pressure. In contrast to actual sawing which can be done profitably only as the teeth remain sharp, friction sawing requires dull teeth. For this reason, a new band reaches its peak efficiency only after a 20-min. period of cutting. A 1-in. thickness limitation is considered practical in friction sawing. This is because an increase in material thickness requires an increase in velocity to generate additional heat. Excessive work pressure which would destroy a new saw immediately if operated at conventional speed on hard materials is imperative when friction sawing.

The efficiency of friction sawing technique as applied

¹ Ceramic plastics are identified as: Mycalex, Lamicaid, Micabond and similar materials.



This 1-in. thick resin bonded ceramic plastic slab is being friction sawed at a saw velocity of 10,000 f.p.m. The cutting rate is around 12 lineal in. per minute

to ceramic plastics can be seen in Table I (given below).

Does friction sawing require a special type of band, or if such terrific heat has to be generated how can the teeth resist the severe strains? These are frequent inquiries and they are answered thus: friction sawing does not require a special type of band so much as a unique method by which it is heat treated. Any high-grade metal-cutting band of 10, 14 or 16 pitch can be used.

It is a fact that the cutting edges must be rounded out to friction cut efficiently but the teeth must retain their set if heat is to be generated directly in front of the teeth rather than the sides. A band with teeth having a hardness extending to the bottom of the gullets, but not beyond, will resist days of cutting on the most abrasive plastics. Ample flexibility at proper place is the answer.

As to why heat has no effect on the teeth, the reason is very clear. The bands used with friction sawing machines are usually about 255 in. long. If 14 pitch, there are 3570 teeth in the band. Although the band revolves at super high speeds, the teeth are in contact with the material only an infinitesimal part of a second so as the long band travels over the 36-in. wheels, the heat is dissipated before a tooth reenters the plastic.

Table I.—Friction Cutting Rates on Ceramic Plastics with a 1/2-In. Wide 14-Pitch Band*

Material thickness	Saw velocity	Cutting rate
in.	ft. per mi.	lineal in. per min.
3/16	4000–5,000	20–30
1/4	5000–6,000	15–25
1/2	6000–7,000	12–20
1	8000–10,000	6–15

* Production rates apply to Doall friction sawing equipment.

The Famous **CUBE STEAK** *Machine*

Wherever you buy or eat cube steak you find the Super Cube Steak Machine. The name Cube Steak is a trade-mark, and can only be applied to steak cut on machines manufactured by the Cube Steak Machine Company, Boston, Massachusetts. These people are the originators and sole manufacturers of Super Cube Steak Machines, so widely used in meat shops and eating places all over America.

The gleaming white Plaskon Molded Color housing of the Super Cube Steak Machine serves many purposes in this application, and serves them well. The color alone is suggestive of cleanliness and sanitation. The non-porous surface cannot be stained or become discolored. It will not tarnish, check, or corrode, and can be kept spotless and bright by ordinary washing.

Plaskon Molded Color has no odor, and cannot impart any odor or taste to foodstuffs. It is an inorganic material, and of itself will not promote the growth of bacteria, mold or fungi.

Plaskon molding materials are available in a beautiful range of colors—clean, clear tones that are uniform and unchanging, because they are solid, permanent color through and through. Plaskon Molded Color is warm and friendly to the touch. Plaskon Molded Material is strong, shock-resistant, won't shatter. It is a non-conductor of electricity, and has high dielectric strength.

We shall be glad to help you adapt the many advantages of these versatile materials to your manufacturing and merchandising needs. Write for free illustrated book showing many applications of Plaskon® products.

*Reg. U. S. Pat. Off.

PLASKON DIVISION • LIBBEY • OWENS • FORD GLASS COMPANY • 2121 Sylvan Ave., Toledo 6, Ohio
Canadian Agent: Canadian Industries, Ltd., Montreal, P. Q.

PLASKON MOLDED COLOR CASE

Has a

CUBE STEAK



The Plaskon Molded Color case
for the CUBE STEAK Machine is
15 $\frac{3}{4}$ " high, 15 $\frac{1}{2}$ " wide, 9"
deep, and weighs 7 lbs., 11 ozs.

PLASKON

TRADE MARK REGISTERED

MOLDED COLOR

What to look for in high frequency heat

TO MOST processors of plastics the buying of high frequency heat sealing equipment is an ordeal. On the one hand these prospective purchasers are prone to expect miracles of this equipment rather than the substantial increases in production and reductions in costs that are reasonable. On the other hand they have little idea of the *how* and *why* of the machine's operation and are made wary by reports of the purchase of expensive equipment that proved to be poorly engineered, clumsily constructed and totally unsuited for the projected plastic fabricating job.

This article is designed to bring the expectations of purchasers of high frequency heat sealing machinery to a sound foundation and, at the same time, to point out the major factors regarding these units that should be checked prior to purchase to insure both the efficient operation of the machine and its adaptability to the job in hand. Most of the points that will be brought out are common-sense criteria that can be applied by anyone primed by the information contained in this article covering initial and production costs and various construction elements of the machine.

What is a high frequency sealer?

A high frequency heat sealing unit is simply a production tool which, when applied to two thicknesses of plastic film, cloth or strip welds or seals them together, in conformity with the shape of the electrode or die, to form a finished product or some component of a product.

Equipment of this type may be used upon all types of vinyl and upon almost every other type of thermoplastic material. Familiar end products that are produced with heat sealers are raincoats, tablecloths, handbags, shower curtains, inflated toys, pillow case covers, belts, baby pants, beachballs, all types of protective jackets and many other items.

Heat sealing is capable of producing a better and less expensive seal between two thicknesses of thermoplastic sheet, and at a faster rate, than is any other method. The truth of this fact is perhaps best substantiated by a few case histories.

There is, for example, the manufacturer who originally produced baby pants by chemically sealing two sheets of vinyl film using heat and pressure. Using this method he required 12 workers to maintain a production rate of 250 dozen pants a day. But within three days of the installation of a high frequency heat sealer this man reached his old production of 250 dozen but he found that he needed only two workers as compared to the 12 formerly employed.

Then there is the case of the belt manufacturer who

used 11 sewers to turn out 10 gross of plastic belts a day. Loose thread ends were burned off at a searing table with a resultant 6 percent spoilage. A heat sealing machine, operated by three unskilled workers, now produces 25 to 35 gross a day with virtually no spoilage.

A third manufacturer upon purchase of a high frequency unit went into the production of inflated toys—items which previously could not be made permanently water tight or strong enough for a child to handle. Now, with two machines and four workers this producer is turning out 8000 inflated ducks, alligators, turtles and fish each day.

What about costs?

From the case histories cited above it would seem self-evident that reduced costs are a natural corollary to the installation of heat sealing equipment. While this is true of properly engineered installations a prospective purchaser of this machinery must consider carefully all elements of cost—initial and operating—to be sure that his products and production plans lend themselves to this equipment and that these costs can be economically amortized.

Initial costs

This first cost consideration includes not only the expense of the heat sealing equipment itself but the costs involved in its installation and the number of accessories that must be purchased before the manufacturer can get under way.

Primary equipment—The cost of primary equipment, that is, the complete unit ready for production, may run anywhere from \$850 to \$10,000, depending upon the product to be sealed, the production rate desired and the make of unit that is purchased. It is important to know that some manufacturers offer the whole works—generator, press and the dies tailored to the requirements of the purchaser. Others simply manufacture the generator and supply plans for the remaining parts—press and dies.

Installation—As for the installation costs, the prospective purchaser should make the inquiries which are listed below. These may be overlooked by a purchaser because of their seeming unimportance in comparison to other considerations.

1. What type current, and of what voltage, is required. Will an expensive new electrical installation be needed or can the machine be plugged into a standard electric line?

sealing equipment

2. Can the unit be moved through ordinary room-size doors and is it of a size to fit available space in the plant? Or will rebuilding be necessary?

Operating costs

Then arises the need for knowing the type of labor needed and extent of repairs to which an owner is liable.

Labor—As a practical working rule it may be said that the ordinary unskilled worker should be able to learn how to operate a high frequency heat sealing unit at a production rate after a half hour of instruction. As for the training, some machine companies provide instruction for key personnel and those responsible for the operation. The exact arrangements should be determined at the time of purchase or there is danger that the unit will stand around useless or be harmed by uninformed employees.

The labor question is closely related to the way in which the machine operates. For example, are all the working controls conveniently set within easy reach or will precious production time be wasted because of extra steps and motions necessary to the units proper functioning? Is the machine built for standing or sitting operation? This question has more bearing on costs than appears on the surface since fatigue can be as great an obstacle as antiquated tools.

Repairs—Repairs, the second element to be considered in estimating operating costs, can be a considerable factor. It is therefore important that the prospective purchaser determine whether the machine is guaranteed. If so, against what and for how long a period of time. Can the buyer look to the machine manufacturer for rapid repairs if necessary? Can the machine manufacturer make new dies or electrodes when they are needed or will he serve only as a consultant?

Safety—Another key element that should be ascertained prior to the purchase of a high frequency heat sealing unit is whether its construction affords the maximum safety to the operator and the surroundings. Whether or not a machine fills this desirable requirement is an index to its efficient design.

Safety for the operator consists mainly of a construction that minimizes the possibility of high frequency burns and injuries from the press. This is best accomplished by construction which makes it necessary for the operator to have his hands elsewhere when the power is on and by having all the power carrying lines and vehicles protected. Injuries by the press can be avoided by having its control independently handled.

Safety for surroundings is insured by a machine

by PHILIP WEISS*

Points to be checked before buying are: material being used, production requirements, cost picture as it relates to initial and operating expenses and the construction of generator, press, electrodes

construction which makes use of such non-combustible materials as glass, steel, copper, plastic. This type of protection is also heightened by completely contained electrical parts which cannot be touched. It is desirable that the whole unit be separately fused so as to protect the machine and, at the same time, guard against stoppage of other production on the same line because of a blow-out of the main fuse.

Construction elements to be checked

No matter what the appearance of a high frequency heat sealing unit it must be composed of three parts:

1. The generator, which translates AC electrical current into high frequency.
2. The press, which transmits the high frequency to the die or electrode.
3. The electrode or die, which applies the high frequency to the parts of the plastic material that are to be sealed. In addition the machine must have at least a minimum of essential controls.

The generator

The generator is the heart of the high frequency unit. Its satisfactory operation revolves around the harmonious operation of three distinct parts: the power supply circuit which boosts and rectifies your regular line current to satisfy the voltage and current requirements of the tube; the tube—or oscillator circuit—which converts this electrical power to high frequency; and the output circuit which conveys the high frequency to the jigs and dies.

The generator must be electrically stable. If it is to comply with the proposed Federal Communications commission rules and regulations it must operate on the frequency assigned to all industrial electronic heating equipment—27.32 megacycles $\pm 1/2$ of 1 percent.

Electrical stability is not simply a legal requirement. It is, in addition, an efficient factor which can spell the difference between a wasteful and a worth-while machine. An unstable generator which shifts off

* General manager, Kabar Mfg. Corp.

frequency loses the power which should be directed into your job and increases the time necessary for each separate weld.

Satisfied as to frequency, the next point to check is whether the generator's "innards" are rigidly constructed. The question here, answerable by examination, is whether normal factory movement of the machine will upset coils, condensers, transformers and wire connections. Are all parts ruggedly constructed, cleanly soldered, firmly connected? Should factory jostling affect any of the parts or connections it would result in a waste of electrical efficiency, or expensive production stoppage.

A third factor to determine is whether the machine is over- or under-rated. In other words, has the manufacturer built his machine to withstand rigors of operation beyond those it might reasonably be expected to meet?

While this might be difficult for someone electronically uninitiated to ascertain, there are some useful tip-offs which can be elicited by questioning. Will the unit stand 24 hr. continuous operation? Are the tubes rated by their manufacturer to meet the voltage and current fed into them by the generator, or are they straining under a harmful burden which will wear them out quickly and cause them to break down at a critical moment in production.

The press

The press is essentially a conveyor which applies the electrodes to the plastic. Because it is the part which will bear the greatest mechanical burden in operation it should be virtually indestructible.

The most important parts of the press are the mechanics by which it is motivated, the plunger, the (die) holder and the bed where work is done.

As a safety factor the press should be motivated independently of the generator. The power most generally used is air. All attachments related to this phase—cylinder, hand or foot valve, speed valves,

pressure regulator, etc.—should be sturdily constructed to insure trouble-free operation and long life.

The main sign of an efficient plunger is its ability to convey the high frequency electrode (or die) to the plastic evenly so that the die hits absolutely parallel to the bed. For that reason the plunger must be machined so that it has an absolute minimum of tolerance on any of its sides, better than 0.001 inch.

A poorly built plunger will allow one side of the die to reach the plastic a split second ahead of the other. The result is an inferior seal and probably an arc, thus ruining the material being sealed.

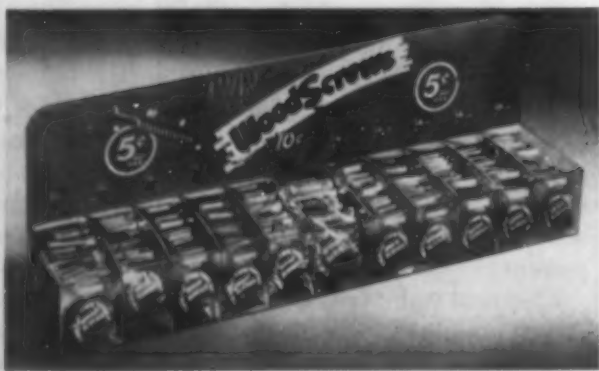
It is also essential that the electrode holder which is attached to the plunger be milled perfectly so as to deliver the electrode perfectly flat upon the bed. It should be capable of holding any size or shape electrode and not require over a minute to change electrode.

For best results, the bed should be made from the finest cold rolled steel, ground true, and should be at least $\frac{1}{2}$ in. thick. If you are working with 0.002-in. thick material and your bed is off 0.001 there is already a 50 percent error which would prevent a good seal.

The electrode

The point of most frequent failure in electronic heat sealing is at the electrode (or die). The electrode in every case except straight "bar" shape welding must be constructed for the particular job in order that it efficiently apply high frequency at the points and in the shapes required. And it must be constructed to do so at a production rate.

Probably the most experienced person in electrode (or die) design will be the manufacturer of the machine. He brings to this decisive part not only an engineering knowledge of the capacity of the machine—how much "weld" can be achieved in what period of contact on any simple seal—but also a stock of invaluable experience in helping others to step-up production to its very limit. For these reasons, many manufacturers accept responsibility for the electrode (or die) design.



AS A NEWCOMER TO THE COMPETITIVE hardware field, Royal Screw Co., Wilmington, Del., felt that a display unit which dramatized its product was essential. A compartmentalized display, fabricated of Kodapak I by Kellogg Container Div., United States Envelope Co., 21 Cypress St., Springfield, Mass., was the result. The unit is made as one large tray with dividers for separating various size screws later positioned and cemented in place. All top edges of display are beaded. The screws themselves are in cellophane packages.

Duplan **GLASS FABRIC HEADQUARTERS**

**21 Standard Glass Fabrics
Lower Prices—Quick Delivery**
..

*Buy Direct from Largest War-time
and Peace-time Weaver of Glass*
..

**Weavers of 27 Nylon and Rayon
Fabrics from High Tenacity Yarn**
..

*Special Industrial Fabrics Designed
and Woven for Manufacturing Uses*

Duplan is your first source for glass industrial fabrics. For 8 years Duplan has woven more glass cloth than any other weaver for the Owens-Corning Fiberglas Corporation. Cloth is made in 21 different weights, from light to heavy.

Now you can buy the standard styles of Owens-Corning Fiberglas fabrics direct from Duplan, the weaver.

GLASS IS NOT EXPENSIVE

Prices are substantially lower than you have paid in the past. Duplan fabric number 6080 (Owens-Corning number X2623) is 25 cents a yard. Consider new lower prices and the advantages of a cloth which won't stretch, won't shrink—cannot absorb moisture—cannot burn—has great tensile strength.

INDUSTRIAL DIVISION

THE DUPLAN CORPORATION



WEAVERS FOR 49 YEARS

Duplan's modern, efficient mills in both the North and South produce quality fabrics for leading manufacturers. Many new developments have been originated by Duplan—giving advantages to Duplan customers.

SEND FOR A LIST OF GLASS FABRICS

A complete list of standard Fiberglas fabrics will be sent to you immediately, on request. It gives weight, constructions, prices, strength and technical information. Get these facts direct from Duplan. Buy your glass cloth direct from the Headquarters for Glass Cloth—Duplan.

SEE NYLON INDUSTRIAL FABRICS

Duplan, world's largest processors of Nylon, weaves 27 Nylon industrial fabrics from Zephyr weight to heavy cloths. Nylon high tenacity fabrics are very strong, mildew resistant, have low water absorption, smooth surface, elasticity. Write for facts on Nylon Industrial fabrics.

512 SEVENTH AVENUE • NEW YORK 18, N. Y.

AUGUST • 1947

141

For special performance

In addition to being a magnet for eyes, colorful BEETLE moldings also stand on their record as great performers.

It will pay you to get all the facts about BEETLE plastics . . . their advantages, economies . . . the possibilities they offer for better design. Send for your copy of the new folder, "Designing for Sales with Molded BEETLE Plastics."

American Cyanamid Company, Plastics Division, 32 Rockefeller Plaza
New York 20, New York

Radio housing molded for Emerson Radio
& Phonograph Corp. by Plastioid Inc.



BE
mo
res
LAN

use Beetle compounds...

WON'T BE SHOCKED

BEETLE moldings offer an unbeatable combination of performance advantages... an important one of which is high electrical insulation properties. And, being a thermosetting plastic, BEETLE will not soften under exposure to heat.

WON'T LOSE SHAPE OR FACE

Because of their dimensional stability and chemical inertness, BEETLE plastics keep their shape—won't warp or sag. And to list a few more A's on the performance report card: BEETLE compounds are not affected by alcohol, acetone, essential oils and common solvents... they are extremely lightweight... odorless, tasteless... and are excellent for diffusion and transmission of light.

WON'T GET LOST IN A SCUFFLE

Don't be afraid of chipping and scuffing. A BEETLE compound is all color. It offers great resistance to wear and abrasion... is mar-proof and chip-proof.

WILL INCREASE YOUR SALES

All signs lead to the fact that, in the future, BEETLE plastics will even break all of their past popularity records. They bring many performance-plus values to the hard-selling days (and nights) that lie ahead... and their permanent, rich colors and finishes start sales moving from the second they get the range of a customer's eyes.

WILL INCREASE YOUR PROFITS

Because BEETLE compounds are so easy to mold and are so easily sold, BEETLE-made products are more profitable for manufacturers, molders and retailers. Book your reservation on the year-round BEETLE plastics sales and profit cruise!

BEETLE* plastics—urea-formaldehyde thermosetting molding compounds. MELMAC* plastics—melamine-formaldehyde thermosetting molding compounds, industrial and laminating resins. URAC* resins—urea-formaldehyde thermosetting industrial resins and adhesives. MELURAC* resins—melamine-urea-formaldehyde thermosetting resin adhesives and laminating resins. LAMINAC* resins—thermosetting polyester resins. PHENAC* resins—phenol modified resorcinol thermosetting resin adhesives.

*Reg. U. S. Pat. Off.

Cyanamid Plastics



all

color

all

colors

Shaw Answers This Phone Call

with a
CLAREMONT PLASTIC FILLER



Handset, ear and
receiver caps and base
case molded by Shaw
Insulator Company,
Irvington, N. J. for
Commonwealth Telephone
and Electric Company.

When called upon to produce these plastics components for a wall-mounted telephone set, Shaw Insulator selected a molding material compounded with a CLAREMONT Cotton Flock Filler.

By using two types of molding—compression and transfer—Shaw engineers were able to design and produce precision-built parts adaptable to speedy, simplified assembly. By specifying a formulation incorporating a Claremont filler, they were assured a material with

good flow qualities which in its end use would be functionally sound and have the desired high quality surface finish.

When the call is for strength . . . there is a Claremont filler that will meet and exceed your requirements. Available in four types (flock, thread, chopped fabric and cord), all are carefully graded, clean, uniform in size and processed to your individual needs. Samples for test runs will be supplied upon request. Inquiries invited!

CLAREMONT WASTE MFG. CO.

CLAREMONT, NEW HAMPSHIRE

THE FILLER

CLAREMONT
FLOCK
THREAD
FABRIC
CORD

IS THE HEART

The Country's Largest Manufacturer of Flock

The effect of pH on the reactivity of resorcinol resins

by PHILIP H. RHODES*

THE interest in resorcinol resins reached a high peak during the war years. Previously, studies of this type of resin were sketchy, and correlated data for the most part were unavailable.

The earlier references on the reaction between resorcinol and formaldehyde indicated the extreme tendency for the two to combine even at relatively low temperatures and in the absence of any catalyst.^{1,2,3,4,5} The initial trend of these experiments was directed to a first hand study of the reactivity to determine the validity of the references. It was found that when resorcinol and formaldehyde containing less than 0.2 percent of free formic acid were slowly warmed, a violent exothermic reaction set in at about 80° C. and did not terminate until all the aldehyde had been reacted. In the presence of a fractional percentage of either acid or alkaline catalysts, the reaction mixture became strongly exothermic without the application of any heat whatsoever. On the other hand, when mixtures of catalysts were employed to buffer the reaction mixture in the vicinity of pH 4.5 to 5.0, the reaction smoothed out to a steady combination of the reactants with the exothermic tendencies reduced to a minimum.

Early references were directed to the production of *one-stage* or *one-step* thermosetting resins. These terms are used to indicate resins which have been prepared from more than one mol of formaldehyde for each mol of phenolic body and which cure upon the application of heat. The manufacture of one-stage resins from resorcinol and formaldehyde has been investigated. During these experiments the use of catalysts buffering in the 4.5 to 5.0 pH range was tried because of the slower reaction velocity under these conditions. However, under this acidic pH an insufficient amount of

formaldehyde was tied up to make a thermosetting resin. When one-stage reactions were tried under neutral or alkaline conditions, the mass went to the insoluble state on standing for a few hours or days. Reactions of this type are discussed in the Novotny patents.^{1,2} The work was finally abandoned in favor of other projects and a one-step resin was not produced.

Room temperature setting resin

Sometime later, interest centered in the development of a resin adhesive capable of setting at room temperature. In view of the earlier work, it was decided that the previously reported speed of the reaction at low temperatures could be utilized in an adhesive for room temperature use. Such a product was particularly desired by the aircraft industry, at that time starting the large scale production of wooden aircraft parts. The existing room temperature setting resin adhesives were considered to have certain weaknesses which it was desired to overcome. Among these were the tendency to craze in heavy glue lines, the lack of durability under tropical conditions of high heat and humidity, and the deteriorating effect of the acid catalysts then employed on cellulosic materials adjoining glue lines.

In reexamining the earlier laboratory work, it was noted that several attempts had been made to make a one-step resin by a two-stage reaction; that is, a resorcinol-formaldehyde resin containing $\frac{2}{3}$ mol of reacted formaldehyde for each mol of the resorcinol was reacted further with additional formaldehyde. In each instance it was recorded that the materials immediately reacted with considerable evolution of heat and formed a completely setup mass which was infusible. It was determined to follow up this reaction in an attempt to control it at room temperatures and thus produce an improved adhesive.

It should be pointed out that although the first two-

* President, Rhodes Industrial Corp.

¹ U. S. patent 1,767,696—Novotny.

² U. S. patent 18,49,109—Novotny.

³ U. S. patent 1,889,751.

⁴ Br. patent 321,697.

⁵ U. S. patent 1,147,264.

Table I.—Properties of Resorcinol Resins Made with Varying Amounts of Sodium Hydroxide as Catalyst
(Ratio of formaldehyde to resorcinol in the resin was 0.67:1.0)

Catalyst	Sticking point	pH of 50% aqueous solution
	° C.	
None	106	2.96
0.2% NaOH	103	5.11
0.4% NaOH	103	5.78
0.6% NaOH	104	6.23
0.8% NaOH	105	6.51
1.0% NaOH	107	6.65
1.2% NaOH	110	6.90
1.4% NaOH	112	7.04
1.6% NaOH	114	7.11

step or permanently fusible resorcinol resins were made using acid⁶ catalysts similar to those employed in making phenolic molding compound resins, the later work had developed methods for making permanently fusible resins using alkaline catalysts such as sodium and potassium hydroxide.⁷ Such reactions, particularly when using 1 or 2 percent of the alkali, with phenol and formaldehyde result in a gel; but with resorcinol and formaldehyde the reaction is very smooth and brittle, permanently-fusible resins are produced. It seemed advisable to investigate the rate of reactivity of the two-step resins with added formaldehyde under varying pH conditions. The ease of forming clear water mixtures of resorcinol resins facilitated this study.

Resorcinol resins having less than 0.85 mol of formaldehyde for each mol of resorcinol are quite miscible with water, but it is felt erroneous to state that they are water soluble. For example, a resin having a pH of about 1.9 to 2.0 will form a clear liquid with an equal weight of hot water. When cold the liquid is still clear and will stand dilution with water until the mixture comprises about 70 percent water and 30 percent resin, at which time there is considerable curdy precipitate formed. As the pH of the resin becomes more neutral, the amount of water which a 50 percent solution will take on dilution without precipitating becomes greater, so that when pH is about 6, solution may be diluted to 3 to 4 percent resin solids before it becomes milky.

It would seem that by varying the amount of alkaline

⁶ U. S. patent 2,385,370—Arthur J. Norton.
⁷ U. S. patent 2,385,372—P. H. Rhodes.

Table II.—Properties of Resins Made with Varying Ratio of Formaldehyde and Resorcinol, Employing 1 Percent Sodium Hydroxide Catalyst

Ratio of formaldehyde to resorcinol	Sticking point	pH of 50% aqueous solutions
	° C.	
0.50:1.0	69	6.62
0.55:1.0	75	6.63
0.60:1.0	82	6.55
0.65:1.0	104	6.69
0.70:1.0	111	6.56
0.75:1.0	131	6.59

or acid catalyst employed, the resulting resins would vary in properties, but it has been determined that variations are all induced by the difference in pH due to the proportion of catalyst used. However, the melting points are more a function of the proportion of formaldehyde employed than the catalyst used. This is shown by sticking points given in Tables I and II.

Preparation of resorcinol resins

A series of resins were prepared using varying amounts of sodium hydroxide as catalyst, the method of preparation being that described in U. S. patent 2,385,372. The resorcinol was placed in a laboratory kettle and a portion of the formaldehyde was added. The reaction mass was warmed until the exothermic reaction started and then heating was stopped. When the mixture had stabilized at reflux temperature, the balance of the formaldehyde was added in a thin stream at a rate sufficient to maintain the reflux. Upon completion of the aldehyde addition, the desired amount of catalyst was introduced and the mixture was refluxed for a few minutes more. Then the reaction product was dehydrated by distillation, first at atmospheric temperature and then under vacuum until the brittle resin poured off at the end of the run contained about 0.5 percent water.

The ratio of reactants, catalyst, the sticking point of the resin and the pH of a 50 percent aqueous solution are given in Table I. The sticking point was determined with a one-inch-square copper bar, heated by a cartridge-type heating element inserted in one end and controlled by a Variac. Thermometer wells every inch were used to indicate the temperature, which varied about 2° C. per inch. The finely powdered resin was dusted onto the hot bar and a fine camel's hair brush was used to brush it off. The point at which the brush failed to dislodge the powdered resin was considered to be the sticking point.

The pH was determined using a 50 percent aqueous solution of the resin, prepared by adding 50 grams of resin to 50 grams of distilled water, bringing the mixture up to boiling, and then cooling to room temperature. The pH was determined using a Beckman meter carefully standardized before each determination.

The data shown in Table I indicate the effect which the amount of sodium hydroxide has on the pH of the sample resin. An equation was set up empirically to cover this relationship for the particular case where the molar ratio of formaldehyde to resorcinol was 0.67 to 1.0. The equation is:

$$\text{pH} = 4.7 \left[\frac{1000 \text{ NaOH}}{\text{resorcinol}} \right]^{0.156}$$

where NaOH and resorcinol are the weight in grams that are used.

In Table II it is shown that the pH remains practically constant when the amount of catalyst is maintained at 1.0 percent, while varying the ratio of formaldehyde to resorcinol. It is further demonstrated in this table that the sticking point (Please turn to page 238)

Acrylate polymers in Germany*

Methyl acrylate—Methyl acrylate monomer is made continuously by the interaction of ethylene cyanohydrin, sulfuric acid and methyl alcohol (Fig. 1). The reaction is carried out in vessel *A* which is lead-lined and is jacketed for steam heating. When starting up, 150 liters of methyl alcohol (86 percent) is run in and vaporized, filling the column *B*. This column is 8 m. high and 60 cm. internal diameter. It is made of iron and is lined first with rubber, then with porcelain tiles cemented on with Asplit. The tower is packed with ceramic Raschig rings approximately 25 mm. long with outside diameter 25 mm. When the tower is filled with alcohol vapor, 78 percent sulfuric acid is added near the top of the column at the rate of 230 l. per hour. Five minutes after starting the sulfuric acid addition, ethylene cyanohydrin (90 percent) is added at the rate of 120 l. per hr. at the same level.

The temperature in the lower vessel *A* is 148 to 150° C. and when the plant is operating properly this vessel should contain 2600 to 2800 kg. This level is determined by differential pressure. A constant pressure of hydrogen is applied and as the volume increases the increase in pressure inside the vessel corresponding to the increase in volume can be read on a manometer which thus warns the operator who runs off the excess to waste when the desired volume is exceeded. When the plant is running properly, methyl alcohol (86 percent) at the rate of 135 l. per hr. is run into the vessel *A* and is there vaporized. It passes up column *B*, down which sulfuric acid and cyanohydrin are circulating. Methyl acrylate, dimethyl ether and a little formaldehyde are formed.

These vapors, together with water vapor and methyl alcohol, pass into a dephlegmator *C* running at 78° C. The dephlegmator tubes are of copper and the bottom is of lead. This dephlegmator removes any cyanohydrin and sulfuric acid spray and effects partial separation of some water.

The vapors are blown by hydrogen (preferred) or nitrogen through a copper pipe *D* to the bottom of a second vessel *E* lined with lead in a similar fashion to the first. This vessel *E* contains 2000 liters of water at a temperature of 95° C. This vessel *E* is fitted with a column *F* which is 6 m. long and 60 cm. diameter, lined the same as column *B* and fitted with ceramic rings. Water at 75° C. and at the rate of 400 to 500 l. per hr. is fed into the top of column *F* which is fitted with a copper tube dephlegmator *G* kept at 55° C. Copper is used, as it is an antipolymerization catalyst. Stabilizer (methylene blue: 10 kg. per 50 tons water) is added intermittently at the top of column *F*.

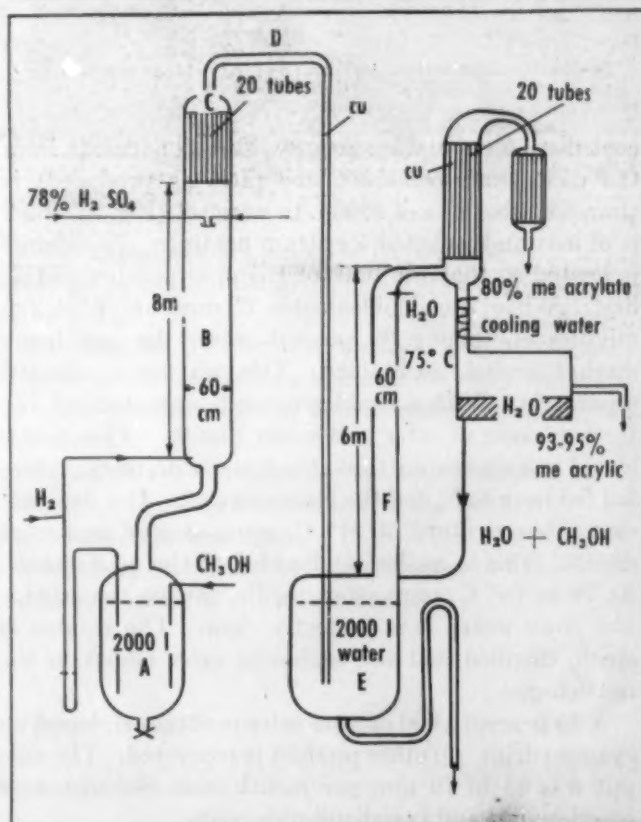
The methyl alcohol is washed out in *E* and further separated in *F* and *G*; the wash water containing 3 to

5 percent methyl alcohol is drawn off from *E* continuously and discarded. The distillate from the dephlegmator *G* consists of 80 percent methyl acrylate with water, methyl alcohol and methyl ether. This distillate is washed by a batch operation in a column similar to *F* and 90 percent crude ester (25 percent of the total ester) is produced. The condensate from column *F* is cooled and run to a separating tank, where it is separated into water and methyl alcohol with 93 to 94 percent methyl acrylate (75 percent of total ester) as top layer. The distillate and the condensate are stored in the tanks separately.

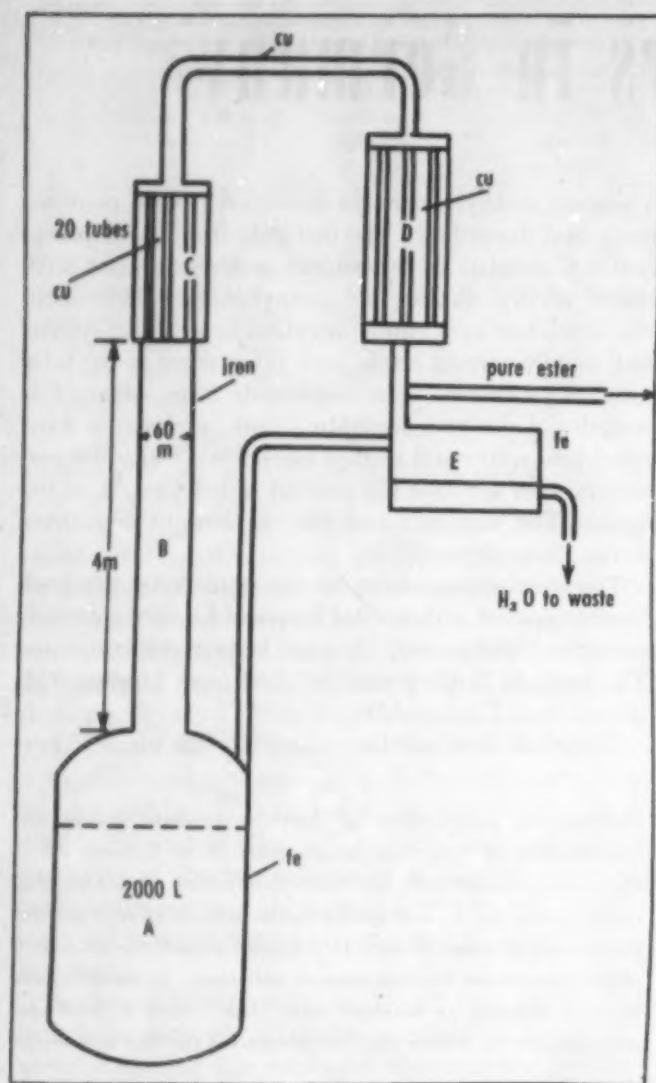
The storage containers for the crude ester are lead-lined or coated with several layers of Luphen (phenolic resin base) and stored. Luphen lasts about two years. The grade of Luphen used is: first coat, Luphen AM; second coat, Luphen AW.

The crude ester mixture which is made up of 75 per-

1—Plant for production of methyl acrylate monomer. Significance of lettering on diagram is as follows: *A* is the reaction vessel; *B*, the tower into which passes alcohol vapor from *A*; *C*, a dephlegmator which effects partial separation of some water; *D*, a copper pipe through which vapors are blown by hydrogen or nitrogen; *E*, vessel where methyl alcohol is washed out; the vessel *F* and dephlegmator *G*, where methyl alcohol is further separated



* "Investigation of German plastics plants. Part I," by G. M. Kline, J. H. Rooney, J. W. C. Crawford, T. Love and F. J. Curtis. This is PB 949.



2—Bath distillation of methyl acrylate monomer

cent distillate and 25 percent washed condensate from the continuous reactor (same ratio as produced) is charged in batches of 2000 l. to vessel A (Fig. 2) which is of iron and jacketed for steam heating. The charge is heated so that the bulk of the methyl ether distills first. When the dephlegmator C runs at 68° C., a mixture containing 80 percent ester, the rest being methyl alcohol, is obtained. This mixture is collected separately. With a dephlegmator temperature of 72° C. a mixture of ester and water distills. This is collected in a separating tank, the water with methyl alcohol fed back to E, and the ester recycled. At a dephlegmator temperature of 74° C. some alcohol and ester distills; this is washed and added to the next charge. At 74 to 76° C. pure ester distills. When the ester is free from water it is perfectly clear. The residue is steam distilled and the separated ester added to the next charge.

A 75 percent yield of pure ester is obtained, based on cyanohydrin; no other product is recovered. The output was 65 to 70 tons per month from one monomer reaction unit and two distillation units.

Ethyl acrylate—The production of ethyl acrylate is carried out in the same type of plant as is used for making the methyl ester. The process is the same up to the production of the first two fractions of crude ester, introducing ethyl alcohol at the rate of 180 l. per hour. These are not treated separately as in the case of the methyl ester but are distilled in a column packed partly with Raschig rings and partly with bubble cap plates. The crude ester is fed into the column at a point 4.5 m. from the evaporator. The temperature of the entering crude ester is 65° C. The evaporator A is heated to give a temperature in the liquid of 100° C. Diethyl ether distills and passes at 34 to 35° C. to a condenser C. Part of the diethyl ether is recycled to the top of the tower to cool the ascending vapors. Ethyl acrylate, water and alcohol azeotropes are taken off at a point 6 m. from the evaporator and transferred to a washing unit of the same type as already described (Fig. 1). The washed ester, freed from alcohol, is fed back to the column. This ester then enters at the 4.5 m. point.

Purified ester (98 to 99 percent) collects in the evaporator from whence it is transferred at the rate of 300 to 400 l. per hr. to a storage tank D and then pumped at 95° C. to the top of a final distillation column F. This column is packed with ceramic Raschig rings. The temperature in the evaporator E is 165° C. Pure ethyl acrylate distills at a temperature of 98 to 99° C. The residue in the evaporator is composed of high boiling liquids (ethyl oxypropionate, etc.) containing in solution any polymer which may have formed. When the concentration of polymers becomes such that the temperature in the evaporator cannot be held at 165° C., the residue is discarded.

The yield of ethyl acrylate calculated on ethylene cyanohydrin is 78 to 80 percent. Three units are installed at Ludwigshafen and are undamaged. The output per unit is 75 tons per month. There is one distillation unit with an output of 10 tons per day. Ethyl alcohol is recovered to the extent of 25 to 30 percent of the alcohol introduced. Diethyl ether is also produced (10 tons ether per 100 tons ester).

Acrylic acid—Acrylic acid is produced as a 50 percent aqueous solution. The process is carried out continuously in a vessel lined with lead or enamel. Sulfuric acid and ethylene cyanohydrin are mixed and run in through a lead pipe, the end of which is turned up. Rate of addition is 100 l. cyanohydrin and 110 l. 78 percent sulfuric acid per hour. The reaction vessel has a capacity of 2000 l. and should always contain a charge of 800 to 1000 kg. This is controlled by a differential pressure gage operated by hydrogen. The vessel is steam jacketed and the contents are heated to 175° C. Live steam is blown into the bottom of the reaction mixture. This steam provides the agitation required and the amount is so regulated that the distillate is a 50 percent solution of acrylic acid. The distillate is condensed and stored in tanks lined with Vinidur. The residue in the (Please turn to page 230)



*Larger container protects refill unit for ball-point pens
—the other protects fountain-pen points*

SMALL PLASTICS IN LARGE VOLUME



Complete molding facilities are available to you now at Owens-Illinois for large volume, high-speed production of small plastic items.

Excellent examples are the containers above. The precision-threaded closures of thermo-setting material are *compression* molded. The clear plastic bodies of thermo-plastic material are *injection* molded.

Expert combination *and co-ordination* of these processes by O-I plastics design engineers assures you of top quality, high-speed production at low cost.

If you need small plastic items in large volume, O-I is ideally suited to serve you. Write us for details.

PLASTICS DIVISION

OWENS-ILLINOIS GLASS COMPANY

TOLEDO 1, OHIO • BRANCHES IN PRINCIPAL CITIES

AUGUST • 1947

149

Plastics Digest

This digest includes each month the more important articles of interest to those who make or use plastics. Mail request for periodicals directly to publishers.

General

PLASTICS CUT BUS BREAKAGES. *British Plastics* 19, 118a (Mar. 1947). Methyl methacrylate transparent sheet plastic has been used for windows in buses and street cars in Levis, Canada, since 1942 with outstanding success.

VINYL RESINS AS CONSUMERS OF ACETYLENE AND ETHYLENE. H. H. Atlas and R. S. Aries. *Chem. Eng.* 54, 101-3, 120 (Mar. 1947). The processes used in the manufacture of vinyl acetate, vinyl chloride, vinyl chloride acetate, vinyl acetal, vinyl alcohol and vinylidene chloride resins are analyzed to determine raw material requirements.

THE SILICONES. *Fortune* 35, 104-10, 224-8 (May 1947). The history, synthesis, properties and applications of the silicones are written into a story for the nontechnical reader. The men behind these developments and the activities of both General Electric and Dow-Corning are included.

NEW MODELING PLASTIC MATERIAL. *British Plastics* 19, 158-61 (Apr. 1947). Modeling materials based on polyvinyl chloride are described. The materials can be carved with sculpturing tools, worked with ordinary tools and readily formed by warming in hot water.

SYNTHETIC-RESIN CEMENTS. E. H. Pinto. *Wood* 7, 195-7 (1946). Thermosetting resinous adhesives are discussed here.

Materials

SYNTHESIS OF TETRAFLUOROETHYLENE. J. D. Park, A. F. Benning, F. B. Downing, J. F. Laucius and R. C. McHarness. *Ind. Eng. Chem.* 39, 354-9 (Mar. 1947). Pyrolysis experiments of monochlorodifluoromethane were carried out in an inert reaction tube at temperatures above 650° C. The effect of such variables as temperature, pressure and contact time on yields of various pyrolyzates was also studied. Generally the relative amounts of the pyrolyzates are functions of pressure and conversion. Tetrafluoroethylene is the only olefin isolated from the pyrolysis products. This chemically reactive compound, a gas boiling at -76.3° C. at 760 mm. mercury, is the basic material used in synthesis of fluorinated compounds useful as refrigerants, dielectric media, solvent media and plastics. A series of compounds having

the general formula $H(CF_2)_nCl$ is also obtained. Members from C_2 to C_{14} were isolated. They are all nontoxic and chemically stable and, with the exception of $H(CF_2)_2Cl$, are new compounds. Another series, the cyclic perfluorides, is also obtained. These are C_3F_8 , C_4F_{10} and C_6F_{14} , also relatively inert and nontoxic compounds. In addition, a third series is obtained. Six compounds present in small amounts were isolated. They are all extremely toxic and have been tentatively identified as fluorochloromethylcyclopropanes.

PREPARATION OF POLYVINYLAMINE, POLYVINYLAMINE SALTS AND RELATED NITROGENOUS RESINS. D. D. Reynolds and W. O. Kenyon. *J. Am. Chem. Soc.* 69, 911-15 (Apr. 1947). Polyvinyl phthalimide was treated with hydrazine to yield a polymer which is believed to be the hydrazine salt of polyvinylamine. Reaction of the latter with acetic anhydride produced polyvinyl acetamide, whereas treatment with hydrohalide acids yielded polyvinylamine salts which were converted by alkalies to the free polymeric base. The following related nitrogenous resins were prepared and characterized: polyvinylamine hydrochloride, polyvinylamine hydrobromide, poly-N-vinyl urethane, poly-N-vinylurea. Polyvinylamine was found to be a relatively strong base forming stable carbonic acid salts.

COLORING PLASTICS. W. S. Penn. *Plastics (London)* 11, 10-16 (Jan. 1947). A new method of coloring plastics is described. This consists of combining reactive groups in the dyes with corresponding groups in the monomers or polymers, thus effecting combination through primary valences. The principle is applied to phenolic and styrene resins. Reds and yellows are the easiest colors to incorporate. The resistance to fading is improved. The color is not destroyed unless the polymer is destroyed.

STABILIZING AQUEOUS SOLUTIONS OF CARBAMIDE RESINS. A. A. Berlin and S. D. Izyumov. *J. Applied Chem. (U.S.S.R.)* 19, 23-9 (1946); *Chem. Abstracts* 40, 6875-6 (Nov. 10, 1946). A stabilizer for carbamide resins is made from phenol, dicyanodiamide and formaldehyde. The optimum amount of the stabilizer for use with the resins was found to be about 10 percent by weight. Detailed directions for synthesizing the stabilizing resin are given.

IMPROVED PROCESS FOR MANUFACTURE OF CELLULOSE ACETATE. P. K. Choudhury. *Science and Culture* 11, 699 (1946). A cellulose acetate for making films is prepared by reacting 100 gm. cellulose with 450 to 500 ml. glacial acetic acid, 350 to 400 ml. acetic anhydride and 6 to 8 ml. of concentrated sulfuric acid. The reaction which requires 6 to 8 hr. occurs in four stages: 15 to 25° C., 25 to 30° C., 30 to 35° C. and 35 to 40° C. The product is a chloroform-soluble triacetate. This is hydrolyzed with dilute acetic acid to an acetone-soluble diacetate.

Applications

PLASTICS FOR FURNITURE. G. Fejér. *Plastics (London)* 11, 178-189 (Apr. 1947). Furniture made of plastic materials and plywoods is described. Laminates and transparent sheets are widely used. Tables, desks, cabinets, bookcases, chairs and handles are made.

PACKAGING IS IMPROVED THROUGH CHEMICAL RESEARCH. *Chem. Eng. News* 25, 1192 (Apr. 28, 1947). Packages made of transparent sheet plastics are described. These packages are made of cellulose acetate, polyvinylidene chloride, rubber derivatives, polystyrene, polyvinyl chloride, polyvinyl chloride acetate and polyethylene.

Coatings

SILICONE RESINS IN PROTECTIVE AND DECORATIVE FINISHES. J. R. Patterson. *Official Digest Federation Paint Varnish Production Clubs* No. 258, 281-90 (1946). Silicone resins are used to modify alkyd and urea resins to increase heat and chemical resistance. The weathering resistance is outstanding. Gloss, hardness, adhesion and toughness need improvement. Resistance to aromatic solvents is poor.

PAINT AND VARNISH REMOVERS. M. A. Lesser. *Soap Sanit. Chemicals* 22, No. 6, 153-5, 159 (1946). Formulations of paint and varnish removers are reviewed; 41 references.

VISCOSITIES OF SOLUTIONS OF CELLULOSE ACETATE IN SOLVENT-PRECIPIANT MIXTURES. S. G. Weissberg and R. Simha. *J. Colloid Sci.* 2, 305-6 (Apr. 1947). The viscosities of dilute solutions of cellulose acetate fractions in acetone-methanol mixtures at 10, 25 and 35° C. are reported and discussed.



ANTICIPATING THE NEED...

Our current work for Public Utilities includes design and construction of 23 power stations and power plant extensions and 220 miles of transmission lines. These installations will make available 1,673,000 KW of additional power to supply the needs of fast growing industrial and farming areas.

Mississippi River Crossing
Tower and Louisiana Power
Station of the Gulf States
Utilities Company in Baton
Rouge.



STONE & WEBSTER ENGINEERING CORPORATION

A SUBSIDIARY OF STONE & WEBSTER, INC.

AUGUST • 1947

151

Technical Briefs

Abstracts of articles on plastics in the world's scientific and engineering literature relating to properties and testing methods, or indicating significant trends and developments.

Engineering

PLASTICS STANDARDIZATION. W. D. Owen. *British Plastics* 19, 48-55 (Feb. 1947). The organization of the group in the British Standards Institution charged with the preparation of specifications on plastics is explained. Two types of specifications are being prepared. Type 1 is based on applications and Type 2 on chemical composition. Provisions are made for coordination between industry groups and for a certification plan based on marking by the manufacturer.

FUNDAMENTALS OF TACKINESS AND ADHESION. J. J. Bikerman. *J. Colloid Sci.* 2, 163-75 (Feb. 1947). The importance of "molecular" and "rheological" forces on different stages of making and breaking adhesive joints is compared. Adhesives usually are applied in liquid form, and the perfection of the contact between the adhesive and the solids to be joined depends above all on the wetting power of the liquid toward the solids. This wetting power is primarily a "molecular" phenomenon. The resistance which must be overcome to separate two solids joined by a liquid adhesive is tackiness. Its mechanism is purely rheological, and tackiness is a function of viscosity. When, in the course of its setting, the viscosity of an adhesive becomes very high, the resistance to separation is still rheological, but is smaller than would be expected from the viscosity. Some new experiments concerning this intermediate region between tackiness and final strength are reported. When the adhesive has set, the resistance to separation is determined by the final strength of the adhesive, which for tensile tests, is identical with the tensile strength of the adhesive film of the given thickness; the final strength, too, is a rheological property. The experiments which are claimed to prove disagreement between final strength and tensile strength are given a different interpretation. The rupture occurs usually within the set adhesive, not between the adhesive and a solid, and consequently molecular forces are not involved in the determination of final strength, probably because of the universal roughness of solid surfaces. Eighteen references.

Chemistry

CROSS-LINKAGE OF LINEAR POLYESTERS BY FREE RADICALS. W. O. Baker. *J. Am. Chem. Soc.* 69, 1125-30 (May 1947). Compounds decomposing to give free radicals, such as benzoyl

peroxide, react with saturated linear polyesters such as polyundecanoates. Cross-linked, thermoset systems, which often still retain microcrystallinity, are ultimately formed. Probably methylene groups α to the ester group are activated by losing a hydrogen atom to a free radical. Two such $-\text{CH}-$ groups may then combine to form a cross-bond, or they may attack other α -methylene groups. Polyundecanoates reacted with small quantities of benzoyl peroxide, short of gelation, yield species whose precipitabilities plotted against their dilute solution viscosities lie on the same curves which are characteristic of the original linear polyesters. Hence, the relation between dilute solution viscosity and solubility is not sensitively affected by branching. However, the relations of these properties to molecular weight are apparently changed. Further, actual thermosetting of polyester plastic, and vulcanization of polyester rubbers is shown by viscosity and creep experiments to follow from these simple free-radical reactions. Similar processes are suggested for aging, oxidation and other reactions of chain polymers containing little or no olefinic unsaturation.

FRIEDEL-CRAFTS CATALYSTS AND POLYMERIZATION. A. G. Evans, G. W. Meadows and M. Polanyi. *Nature* 158, 94-5 (1946). Experimental evidence is presented to show that the polymerization of isobutene catalyzed with boron trifluoride requires the presence of a small trace of water.

PHASE SEPARATION IN POLYMER SOLUTION. A. Dobry and F. Boyer-Kawenoki. *J. Polymer Sci.* 2, 90-100 (Feb. 1947). The phase separation in solutions of high polymers in the same solvent (technically known as incompatibility) has been studied for 14 high polymers (cellulose, vinyl and acrylic derivatives) dissolved in 13 solvents. The influence of solvent, concentration, molecular weight and constitution of the macromolecules has been studied for 78 mixtures; the results are represented in triangular diagrams. Incompatibility appears to be the normal situation, compatibility the exception. Moreover, in certain cases the exception may be only apparent. Phase separation is discussed in its relation to osmotic pressure, solubility and the isomorphism of the molecules. Phase separation furnishes new means—useful at least for technical research—of measuring the molecular weight of macromolecules. It is a simple and rapid procedure.

FRACTIONATION OF HIGH-POLYMERIC SUBSTANCES. L. H. Cragg and H. Hammerschlag. *Chem. Rev.* 39, 79-135 (1946). The methods used for fractionating high polymeric materials are reviewed. These include fractional precipitation, fractional solution, differential rate of solution, ultracentrifugation and molecular distillation. There are 312 references.

RELATIVE REACTIVITIES IN VINYL COPOLYMERIZATION. T. Alfrey, Jr. and C. C. Price. *J. Polymer Sci.* 2, 101-6 (Feb. 1947). From data in the literature on relative rates of copolymerization it has been possible to evaluate two constants, Q and e , characteristic of an individual monomer, which appear to account satisfactorily for its behavior in copolymerization. The constant Q describes the "general monomer reactivity" and is apparently related to possibilities for stabilization in a radical adduct. The constant e takes account of polar factors influencing copolymerization.

KINETIC STUDY OF THE UREA-FORMALDEHYDE REACTION. L. E. Smythe. *J. Phys. & Colloid Chem.* 51, 369-78 (Mar. 1947). The reaction between urea and formaldehyde in aqueous solution within defined conditions is shown to be mainly of the slow bimolecular type. A method for estimating the free formaldehyde during the course of a urea-formaldehyde reaction is presented.

Properties

IGNITION TEMPERATURES OF RIGID PLASTICS. E. M. Schoenborn and D. S. Weaver, Jr. *ASTM Bulletin* 1947, 80-7 (May 1947). The temperature at which a plastic will ignite and the rate at which it burns may be considered as two separate and independent measurable properties. This paper describes a method for evaluating the first property, the surface temperature at the moment of ignition. Flammability data are presented for over 25 different materials under a variety of test conditions. By measuring the actual temperatures which prevail at known points within a specimen at the instant of ignition it is possible to evaluate an apparent ignition temperature for the surface. This temperature value is found to depend primarily upon the nature of the substance and upon the temperature of the heat source. At any given furnace temperature, it is also shown that the apparent ignition temperature is a



now
you
can
make

top-quality dielectric laminates without cresol!

USE

No. 5040 **PLYOPHEN**

Both dielectrically and mechanically, paper or canvas laminates produced with this 100% phenol-base varnish are as good or better than those produced with scarce, general purpose cresol varnishes. Because the extenders normally used with phenol varnishes to increase dielectric properties caused a

reduction in desirable physical properties, RCI developed this new resin which does not require weakening modifying agents. Available also in black as No. 5041 Plyophen, this long-awaited resin is now available in reasonable quantities. For details write direct to the Sales Department in Detroit.

REICHOLD CHEMICALS, INC.

General Offices and Main Plant, Detroit 20, Michigan



Other Plants: Brooklyn, New York • Elizabeth, New Jersey • South San Francisco, California • Seattle, Washington • Tuscaloosa, Alabama
Liverpool, England • Paris, France • Sydney, Australia • Zurich, Switzerland • Milan, Italy • Rio de Janeiro, Brazil

SYNTHETIC RESINS • CHEMICAL COLORS • PHENOLIC PLASTICS • INDUSTRIAL CHEMICALS

AUGUST • 1947

153

function of the time required to ignite the specimen. This relationship is essentially independent of the nature of the materials tested and appears to hold over a wide range of temperatures and times. Results obtained on the thermosetting and thermoplastic types investigated preclude the establishment of a single furnace temperature for all materials. The probable mechanism of ignition is discussed. A rigorous analysis of the flammability problem is complicated by lack of information on the thermal properties and by the difficulty of applying unsteady state heat transfer theory to materials which deform, decompose or are otherwise thermally unstable at temperatures involved.

POLYELECTROLYTES. I. PIC-RATES OF 4-VINYLPYRIDINE-STYRENE COPOLYMERS. R. M. Fuoss and G. I. Cathers. *J. Polymer Sci.* 2, 12-15 (Feb. 1947). The conductance in diphenyl ether at 35° C. and 60 cycles of the picrate of a 4-vinylpyridine-styrene copolymer (10:90) was measured. The equivalent conductance, based on the nitrogen content, is of the same order as that of picoline picrate and varies with concentration in accordance with the law of ion association.

SORPTION OF WATER VAPOR BY HIGH POLYMERS. S. E. Smith. *J. Am. Chem. Soc.* 69, 646-51 (Mar. 1947). A method for the graphic analysis of data on the sorption of water vapor by high polymers is presented. The method subdivides the weight fraction of sorbed water into a bound and a normally condensed fraction. Hysteresis in the sorption isotherm is a consequence of variation in the fraction of bound water present in the adsorption and desorption processes, the bound fraction being always larger on desorption than on adsorption. A mechanism for the development of hysteresis is suggested. Conditions for the development of hysteresis are: 1) an enlargement of the sorptive surface as a consequence of swelling and 2) the presence of rigid structural elements in the polymer having dimensions relatively large compared to those of the sorbate molecules. The method is compared and contrasted with that of Brunauer, Emmett and Teller.

Testing

SIMPLIFIED METHOD FOR THE MEASUREMENT OF OSMOTIC PRESSURE OF SYNTHETIC MACROMOLECULES. A. Dobry. *J. chim. phys.* 42, 114-16 (1945); *Chem. Abstracts* 40, 6320 (Nov. 10, 1946). When a solution in equilibrium with its concervate is diluted with pure solvent, the osmotic pressure is directly proportional to the concentration. Miscibility is observed if the solution is near the critical concentration. In this case a single osmotic pressure measurement gives the mean molecular weight. The principle is demonstrated

with cellulose acetate in chloroform and ethanol, polystyrene in carbon tetrachloride and acetic acid and polyvinyl alcohol in benzene.

STANDARD TEST FOR GREASE-PROOFNESS. *Modern Packaging* 20, 165-6 (Apr. 1947). The Packaging Institute method for determining the resistance of a material to transudation by oils is described.

COMPLETE APPARATUS FOR DETERMINATION OF OSMOTIC MOLECULAR WEIGHTS. G. D. Sands and B. L. Johnson. *Analytical Chem.* 19, 261-4 (Apr. 1947). The procedures and apparatus for determining molecular weights from osmotic pressure measurements are described and illustrated in detail. By using a dozen of the static osmometers simultaneously, a complete molecular weight determination can be made in one to four days. Representative data for standard government specification GR-S polymers and for samples of German Buna S-3 subjected to various treatments illustrate the results obtained. Reproducibility of osmotic heights is of the order of 5 percent.

ABRASION TESTS ON RUBBER. T. R. G. Lewis. *Trans. Inst. Rubber Ind.* 21, 375-90 (1946). An abrasion machine used extensively in England for rubber products is described. Although this machine has been used many years it has not been described previously.

Synthetic rubber

EFFECT OF SILVER SALTS ON EMULSION POLYMERIZATION SYSTEMS CONTAINING BUTADIENE. L. W. Rainard. *J. Polymer Sci.* 2, 16-20 (Feb. 1947). The addition of silver nitrate to polymerizable systems containing butadiene can result in increased over-all rates of conversion. When butadiene is the only monomer and a cationic soap is used the addition of silver nitrate causes a significant decrease in rate. The most active system studied was one which contained butadiene, styrene, a cationic soap, a peroxide and silver nitrate. Comparison runs in a GR-S type formulation with silver nitrate and potassium ferricyanide indicate that the silver salt is the more effective in producing higher over-all rates of conversion.

MOLECULAR WEIGHT OF GR-S FRACTIONS. D. M. French and R. H. Ewart. *Analytical Chem.* 19, 165-7 (Mar. 25, 1947). Osmotic molecular weight measurements were made on a sample of unfractionated GR-S and on eight fractions of this material. The molecular weights ranged from 10,000 to approximately 1,000,000, with a number average at 92,000. The relationship between molecular weight and viscosity for GR-S was determined. A simple all-glass os-

mometer for use in hydrocarbon solvents is described, and information on its use and the membranes employed is given.

MERCAPTANS AS MODIFIERS.

I. M. Koltzoff and W. E. Harris. *J. Polymer Sci.* 2, 49-71 (Feb. 1947). A close correlation exists between the modifying effect of mercaptans in emulsion copolymerization of butadiene (75 parts) and styrene (25 parts) and mercaptan consumption during the polymerization. A procedure is described for the rapid amperometric titration of mercaptans in latices. Mercaptan disappearance curves (i.e., mercaptan used at various conversions) are given for a series of primary and tertiary mercaptans of widely varying molecular weight and of two secondary mercaptans. The consumption of (and modification by) primary mercaptans is affected to a much greater extent by the molecular weight of the mercaptan than that of tertiary mercaptans. The consumption of pure and of commercial *n*-dodecyl mercaptan is greatly affected by the mode and rate of agitation during the polymerization, manner of preparation of the charge (preformed soap and soap "in situ," separate emulsification of the modifier), dilution of the monomers with inert organic solvents, excess of free caustic in the charge, amount and kind of emulsifier, and the presence of substances which form complexes with the mercaptan. The consumption of tertiary dodecyl mercaptan is not affected by these variables. The difference in behavior between the two mercaptans is interpreted as a faster rate of solubilization into the locus of the reaction of tertiary mercaptans than of primary mercaptans of the same molecular weight. The disappearance curve of a mercaptan from a mixture of two mercaptans remains unaffected by the presence of the other mercaptan. At the same conversion the consumption of a mercaptan increases with decreasing temperature. Disappearance of mercaptan during the polymerization as a result of nonmodifying reactions is discussed.

PHOTOLYSIS OF RUBBER. L. Bateman. *J. Polymer Sci.* 2, 1-9 (Feb. 1947). Rubber hydrocarbon irradiated in vacuo is decomposed by ultraviolet light of wave length less than 4000 Å. The rubber very rapidly becomes insoluble, and liberates a gaseous mixture which consists mainly of hydrogen when the irradiation temperature is less than 150° C. The reaction characteristics were investigated and point to the occurrence of dissociation processes similar to those deduced for comparable simple olefins. When irradiated above 150° C., small but significant amounts of isoprene appear in the volatile product, thereby providing an experimental means of determining the activation energy for the separation of isoprene from a polyisoprene chain terminated by an allyl radical.



Tenite decoys manufactured by Majestic Molding Co., Elyria, Ohio

Tenite Decoys

DECOYS molded of Tenite spare duck shooters a lot of the trouble and maintenance customarily connected with decoys. Seasonal painting is eliminated through use of lifelike, dull-finish lacquers that have a special affinity for Tenite. Molded keels are preweighted at the factory with cast iron for natural floating action. (Bottoms of wooden decoys have to be bored and filled with lead by the purchaser.)

These decoys are each comprised of seven rapidly injection-molded Tenite parts welded together in lightweight, permanently buoyant assembly which is

unaffected by exposure to weather and water. Water-logging, swelling, and cracking constitute no hazard.

Tenite is made into many other products intended for hard outdoor use—among them, gunstocks, fish-net floats, carrying cases for fly rods, lawn-mower rollers, electric-fence gate handles, and irrigation siphon tubes. It is equally suited to decorative items, and to many industrial applications. For information about the range of physical properties and uses of Tenite, write to TENNESSEE EASTMAN CORPORATION (Subsidiary of Eastman Kodak Company), KINGSPORT, TENNESSEE.



Five molds are used for these seven molded decoy parts. Ribbing adds strength to top and bottom.

TENITE AN EASTMAN PLASTIC

U. S. Plastics Patents

Copies of these patents are available from the U. S. Patent Office, Washington, D. C., at 25 cents each.

TEXTILES. R. P. Foulds and J. T. Marsh (to Tootal Broadhurst Lee Co. Ltd.). U. S. 2,416,988, Mar. 4. Textile material is delustered by impregnating with a solution containing urea and contacting in another phase with another solution containing an aldehyde and an acid, whereby an insoluble, non-resinous, synthetic condensate is precipitated in particulate form on the material to deluster same; and washing to remove any resin-formable material.

COATING PROCESS. B. C. Miller (to B. C. Miller, Inc.). U. S. 2,417,009, Mar. 4. A method for coating sheet material with high melting thermoplastic material having a sharp melting point not exceeding 300° F. comprising printing a surface of a continuously advancing web with said thermoplastic heated to a liquid state, thereafter spreading and smoothing the thus applied thermoplastic in a single step into a continuous even film solely by the conjoint application of heat together with pressure.

MELAMINE RESIN. J. D. Pollard (to American Cyanamid Co.). U. S. 2,417,014, Mar. 4. An acidic solution of a partially polymerized melamine-formaldehyde condensate in a solvent comprising an aqueous, aliphatic polyhydric alcohol solution containing at least 5 percent water, 30 percent water-soluble polyhydric alcohol, and 5 to 50 percent melamine resin, said solution having a pH of 4.0 to 6.8.

SOLE ATTACHMENT. P. H. Dixon and J. R. Ioannilli (to United Shoe Machinery Corp.). U. S. 2,417,065, Mar. 11. A method of attaching articles by means of a thermoplastic cement applied to the margin of at least one of the attaching surfaces, comprising interposing a member between the marginal attaching surfaces in surface contact with the cement, applying pressure so as to bring the mid-portions into contact, creating heat after it has been brought into position, withdrawing the heated member laterally of the sole and pressing the articles firmly together.

CURED POLYMER. W. J. Sparks and H. B. Kellog (to Jasco, Inc.). U. S. 2,417,093, Mar. 11. In the processing of a synthetic solid plastic hydrocarbon interpolymer of an iso-olefin with a conjugated diolefin, the step of heating a solution of the interpolymer with a sulfur chloride to a reaction temperature causing evolution of hydrogen chloride to produce a partly sulfurized polymer which is millable

to plasticity and is reactive with elemental sulfur to yield an elastic product.

HEAD LAMP CASING. R. P. H. Hinds. U. S. 2,417,162, Mar. 11. A unidirectional automobile head lamp containing a plastic casing.

PINE-WOOD RESIN. A. L. Rummelsburg (to Hercules Powder Co.). U. S. 2,417,180, Mar. 11. The melting point of a pine wood resin, containing between 30 and 95 percent hydrocarbon-insoluble material, is increased by heating said resin for about 1 to 100 hr. at a temperature between 100 and 250° C. with a boric acid compound such as boric acids, esters of boric acids and anhydrides thereof.

POLYMERS. R. E. Christ and B. M. Marks (to E. I. du Pont de Nemours & Co., Inc.). U. S. 2,417,238, Mar. 11. A process for casting polymerizable compounds to form shaped articles, comprising subjecting a compound such as esters of acrylic, α -chloroacrylic or methacrylic acids in bulk to polymerizing conditions in the presence of a catalyst mixture consisting of an organic peroxy compound, sulfur dioxide and a 1,3-dioxolane.

PLASTIC VALVE. V. W. Eckel (to Adel Precision Products Corp.). U. S. 2,417,242, Mar. 11. A valve composed of plastic material.

COPOLYMERS. G. F. D'Alelio (to Pro-phy-lac-tic Brush Co.). U. S. 2,417,293-4, Mar. 11. A cohesive, workable, reversible gel adapted to the preparation of shaped or molecularly oriented structures comprising a liquid nitrohydrocarbon and the polymerizate of a mixture of acrylonitrile, a material such as styrene and a vinyl ether.

TEXTILE TREATMENT. J. H. MacGregor (to Courtaulds Ltd.). U. S. 2,417,312, Mar. 11. A process for improving the dyeing affinity of cellulosic textile material and imparting a softness thereto, comprising treating before dyeing with an aqueous solution containing a guanidine salt of an alpha-beta unsaturated carboxylic acid, which is devoid of amino groups, and formaldehyde, and thereafter converting to a water-insoluble condensate.

VARNISH. L. K. Scott (to Devoe and Reynolds Co., Inc.). U. S. 2,417,327, Mar. 11. In the preparation of varnishes, the step comprising simultaneously reacting together rosin, maleic anhydride, and a fatty oil having non-conjugated

ethylene linkages, such as a drying oil or a semi-drying oil, at a temperature between 200 and 320° C., the reaction being carried out in the absence of polyhydric alcohol.

COATING. G. R. Barrett (to Monsanto Chemical Co.). U. S. 2,417,344, Mar. 11. A lacquer composition comprising a cellulose derivative such as a cellulose ether or ester thinned with solvent; an organic pigment suspended therein, said pigment being an inorganic oxide or Aerogel; and a small amount of dibutylamine pyrophosphate sufficient to prevent settling of the pigment.

FLUORESCENT FABRIC. J. L. Switzer. U. S. 2,417,383, Mar. 11. A signal and display panel comprising a web of cellulose acetate fabric, a bleeding daylight fluorescent dye dispersed in said web, a resinous anchor coat on the reverse side of said web, a stratum of diatomaceous earth on the anchor coat, a pigmented coat comprising a pigment dispersed in a cellulose ether, a resinous anchor coat on the obverse side and a clear cellulosic overcoat.

COPOLYMER. L. M. Minsk and C. C. Unruh (to Eastman Kodak Co.). U. S. 2,417,404, Mar. 11. A resinous copolymer is prepared by heating in the presence of a catalyst a mixture of a compound such as vinyl acetate, methyl acrylate, methyl α -methacrylate or styrene; with a diacylate of a monocarboxylic acid such as benzoic, acetic, propionic or butyric acids; and an unsaturated aldehyde such as acrolein, α -methacrolein, α -ethacrolein, α -bromacrolein, crotonaldehyde, α -chloro-crotonaldehyde or cinnamic aldehyde.

COATED FABRIC. F. J. Bellac. U. S. 2,417,405, Mar. 18. A coated flexible fabric sheeting comprising a rubberized fabric base provided with an intermediate coating containing cellulose nitrate, a solvent, dibutyl phthalate, alkyd resins having plasticizing properties, butyl stearate, diluents, pigments, dioctyl sodium sulfosuccinate and a final cellulose nitrate coating applied to intermediate coating.

ABRASIVE. S. S. Kistler and L. Coes (to Norton Co.). U. S. 2,417,419, Mar. 18. In the preparation of an abrasive article, the step comprising confining a mixture of abrasive grains and a heat softening bonding material in an envelope which is rigid at room temperature, but which becomes pliable under heat, and heating said assembly under pressure.

(Please turn to next page)



SUPPLEX*

The new type plastic hose

- Withstands up to 380 p.s.i. at 77° F.
- Crack proof
- Resists oil, grease, gasoline, acids, soap



1



2



3

The SUPPLEX is the entirely new plastic hose that is light as a feather. In fact, it weighs only $\frac{1}{3}$ as much as the ordinary rubber hose and lasts twice as long.

The SUPPLEX hose has a ribbed surface that withstands rough use. It is unaffected by continuous exposure to the sun and is unaffected by freezing weather. The fittings are plated brass and will withstand over 300 pounds pull.

The SUPPLEX hose will deliver the same amount of water year in and year out. It will not swell, soften, or deteriorate. SUPPLEX hose is made of extruded ELASTRON.* Order through your local hardware retailer, or department store.

- 1 For garages—SUPPLEX withstands oil, grease, gasoline, soap and abrasion.
- 2 For industrial plants, SUPPLEX is lightweight, reduces fatigue. Is easy to handle, takes rough use.
- 3 Its lightweight makes it ideal for garden use. Silvery-grey color reflects ultra-violet rays which can damage ordinary hose.

* Reg. T. M. Pend.
† Reg. U. S. Pat. Off.

INDUSTRIAL SYNTHETICS CORPORATION

225 North Avenue

Garwood, New Jersey

MODIFIED RUBBER. G. H. Latham (to E. I. du Pont de Nemours & Co., Inc.). U. S. 2,417,424, Mar. 18. The process comprising treating an aldehyde-modified natural or synthetic rubber with an organic compound having from two to three groups having the N double bond C double bond X structure wherein X is a chalcogen of atomic weight below 33.

TEXTILE PRODUCT. W. Wade (to American Viscose Corp.). U. S. 2,417,453, Mar. 18. A textile product is prepared by forming a structure of composite potentially adhesive filaments, comprising at least two integral portions, one such portion being a core and the other a sheath portion exterior to and encasing the core portion and constituting a smooth longitudinally continuous and homogeneous filament surface, said core being formed of non-cellular organic material and the sheath being formed of a thermosetting resin in the thermoplastic state, heating said structure to cause the sheath portions of adjacent filaments to soften and adhere to each other and to cause interpolymerization of the thermosetting resin to the infusible state.

COATING REMOVAL. V. J. Canziani and F. W. Stellwagen (to Fairchild Camera & Instrument Corp.). U. S. 2,417,468, Mar. 18. A flexible polymer insulation is stripped from a wire by immersing in a bath including a fatty acid of 16 or more carbon atoms; thereafter, immersing in a second bath containing a substance capable of dissolving the acid and thereafter stripping coating from wire.

PLASTIC ARTICLE. A. B. McGinnis (to Wheeling Stamping Co.). U. S. 2,417,510, Mar. 18. A reinforced hollow plastic article having a resin-impregnated reinforcing fabric sheet on the inner surface thereof, defining a substantially complete lining therefor and having integrally bonded to the resin in said impregnated sheet and over the outer surface thereof a continuous layer of a resinous substance comprised of resinous molding material.

TEXTILE SOFTENING. J. Nelles, O. Bayer, W. Tischbein and F. Baehren (to the U. S.). U. S. 2,417,513, Mar. 18. A soft touch is imparted to textile materials by incorporating therein a basic-nitrogen-containing linear ester polymer obtained by heating to condensation an aliphatic dicarboxylic acid or functional derivative thereof with an aliphatic dihydric alcohol or functional derivative thereof, said components being selected in such a manner that at least one reactant contains basic nitrogen, for a period of time such that the polyester is not strongly sticky andropy.

LAMINATED STRUCTURES. P. Crosley, III. U. S. 2,417,586, Mar. 18. A laminated structure is prepared by superimposing at least one layer of fibrous

material over a form while said layer is saturated and wet with a solution of a partially reacted thermosetting resin, stretching a woven fabric over the outer surface of said fibrous material so as to build up an internal pressure on said layer prior to curing the resin and curing while maintaining in stretched condition.

COPOLYMER CONDUCTOR. D. T. Mowry (to Monsanto Chemical Co.). U. S. 2,417,607-8, Mar. 18. An interpolymer prepared by forming a mixture of a vinyl aromatic hydrocarbon and fumarodinitrile and heating; an electrical conductor embedded in a resinous polymeric material comprising the interpolymerizate of styrene and fumarodinitrile.

BRUSH. E. W. Hall. U. S. 2,417,750, Mar. 18. In a brush, the combination of a mass of individual bristles and a holder comprising a handle and molded adhesive plastic head into which the ends of the bristles are embedded.

ADHESIVE. J. J. Verbanc (to E. I. du Pont de Nemours & Co., Inc.). U. S. 2,417,792, Mar. 18. An adhesive composition suitable for bonding textile reinforcing structures to elastomeric stock comprising the reaction product of an organic di-isocyanate and an elastic isoprene polymer dissolved in an organic solvent for said reaction product.

LAMINATING. L. Paggi (to E. I. du Pont de Nemours & Co., Inc.). U. S. 2,417,837, Mar. 25. A sheet of plastic prepared from polymeric acrylic or methacrylic acids, their esters, or anhydrides is laminated to another sheet comprising a plasticized polyvinyl acetal resin by coating the first sheet with a water-insoluble plasticizer therefor and a polysilicic acid sol in an organic solvent for said plasticizer, drying coating thus formed, placing the second sheet on the coated surface and uniting the two under both heat and pressure.

IMPREGNATION. S. H. A. Young (to Hawley Products Co.). U. S. 2,417,851, Mar. 25. In the impregnation of a fibrous plastic article the steps of providing a predetermined mixture of liquid water-soluble and water-dispersible resins containing resin particles in suspension, placing an accreted preformed fibrous carcass containing water from an accreting process in its interstices on a suction die having a surface contour corresponding to the shape of the carcass, but with openings therethrough, immersing the die and carcass into a bath of the mixture, creating a suction through the die and thereby drawing a solution of water-soluble resins into and through the carcass, thereby replacing interstitially held water and simultaneously selectively coating and impregnating with particles of water-dispersible resin and providing the surface with a high concentration of the suspended particles.

TEXTILE TREATMENT. C. F. Goldthwait, H. O. Smith and L. B. Barnes (to U. S. Dept. of Agr.). U. S. 2,417,869, Mar. 25. Textiles are finished by dissolving in an aqueous cuprammonium solution a cellulose hydroxyethyl ether which is water-insoluble, applying the resulting solution to textile and drying textile.

COMPOSITE PIPE. C. G. Munger (to American Pipe & Construction Co.). U. S. 2,417,881, Mar. 25. A composite plastic-metal pipe unit is prepared by cleaning the interior of the pipe, applying to the cleaned surface a coating of plastic adhesive, inserting a rigid, imperforate, thermoplastic tube, simultaneously applying fluid pressure to interior of tube, heating to bond tube to pipe interior and finally cooling while holding fluid pressure.

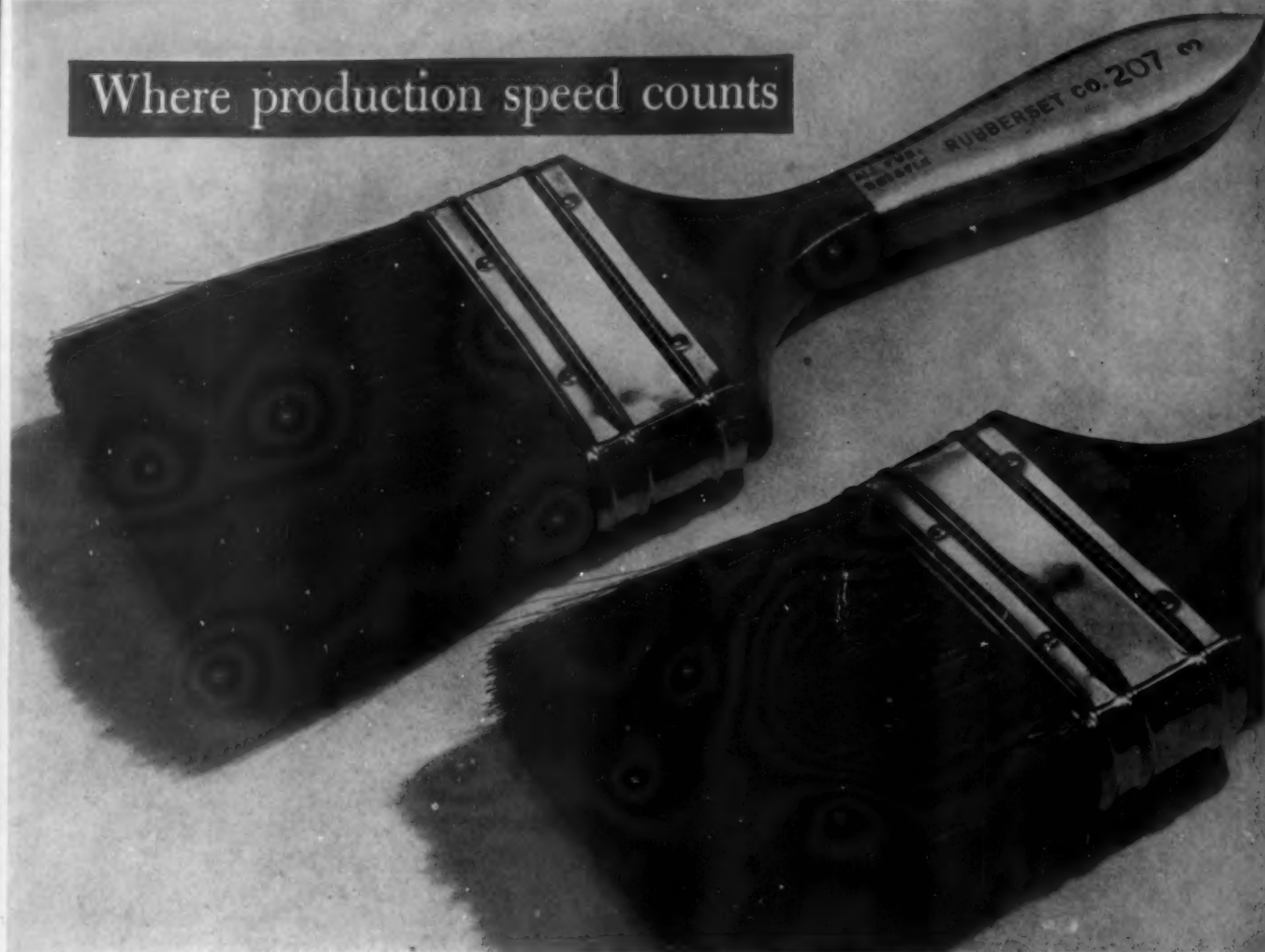
COATING. G. M. Powell, III, and E. F. Carlston (to Carbide & Carbon Chemicals Corp.). U. S. 2,417,885, Mar. 25. Articles having a copper surface are coated by applying a solution containing water, ammonia and a water-insoluble partially hydrolyzed polyvinyl ester or a water-insoluble partially hydrolyzed polyvinyl acetal, permitting the liquids of the solution to remain in contact with the copper surface until a bluish-green color is observed, heating the coating at a temperature of at least 325° F. and thereby forming an adherent alcohol-insoluble film on said surface.

CASTING RESIN. C. S. Webber; S. B. Luce and F. M. Murdock (to Monsanto Chemical Co.). U. S. 2,417,959, Mar. 25. A cast phenol resin prepared by reacting 1 mol of phenol with considerably more than 1 mol of formaldehyde under alkaline conditions, acidifying the reaction mixture, adding phenol reacted with formaldehyde to form a Novolak resin in the proportion of 20 parts of Novolak per 100 parts of phenol in the original mixture, pouring into a mold and hardening by heating.

RUBBER-RESORCINOL RESIN COMPOSITION. E. S. Ebers (to U. S. Rubber Co.). U. S. 2,417,975, Mar. 25. The process comprising reacting in aqueous medium resorcinol, formaldehyde and an amine such as monomethylamine, dimethylamine, diethylamine, *n*-propylamine, isopropylamine, di-*n*-propylamine or di-isopropylamine to form a potentially reactive resin, and mixing said resin, while still in the dissolved state, with alkaline latex.

LIGNOCELLULOSIC BOARD. A. J. Stamm and H. Tarkow (to U. S.). U. S. 2,417,995, Mar. 25. Lignocellulosic board materials are partially acetylated by impregnating such board material having a moisture content of about 2 percent with the vapor from a moisture-free liquid acetylating medium containing acetic anhydride at a temperature between 140 and 230° F. until a gain in weight of 15 to 25 percent has occurred.

Where production speed counts



Brushes furnished by courtesy of Rubberset Company

rely on Paraplex Laminating and Casting Resins

When your product calls for a laminating or casting resin, you can turn with confidence to the polyester types in the Resinous Products line. These 100% reactive resins cure at low temperatures—with or without pressure—to clear, tough thermoset compositions. Virtually any degree of flexibility can be attained by choice of the proper grade...or by blending of grades.

For example, the high strength, toughness and adhesion of PARAPLEX P-43 make this resin ideal for setting paint bristles. Perma-

nence, durability and resistance to paint solvents and oils are other important advantages. No long drying periods...no complicated production steps...no long vulcanization. These features add up to production speed and economy.

We'll be glad to work with you in the selection of the resin for your laminating or casting applications. Send for complete literature describing PARAPLEX P-10, P-13, P-43, and P-33.

PARAPLEX is a trade-mark, Reg. U. S. Pat. Off.

Represented by Cia. Rohm y Haas, S.R.L., Carlos Pellegrini 331, Buenos Aires, Argentina, and agents in principal South American cities.

THE RESINOUS PRODUCTS & CHEMICAL COMPANY

WASHINGTON SQUARE, PHILADELPHIA 5, PA.





Plastics Stock Molds

SHEET ONE HUNDRED FIFTY TWO

Plastic trays have become a cafeteria standby. They also have widespread use in institutions, wherever serving must be handled with efficiency. Serving food to baby also benefits by the efficiency of plastics.

1764. Serving tray, which is of the cafeteria type, has an overall measurement of 20 by 15 inches.

1765. Serving tray, which is also of the cafeteria type, has an overall measurement of 18 by 14 inches.

1766. This six compartment tray has an overall measurement of 15 by 11

* Reg. U. S. Patent Office.

inches. With this design, food may be served directly into the compartments.

1767. This particular plastic item comprises a compartmented infants' feeding dish, tumbler and utensils. Tumbler diameter, $2\frac{1}{2}$ in. at top, 2 in. at bottom, height $3\frac{1}{2}$ inches. It is designed to fit exactly into a special compartment on the molded

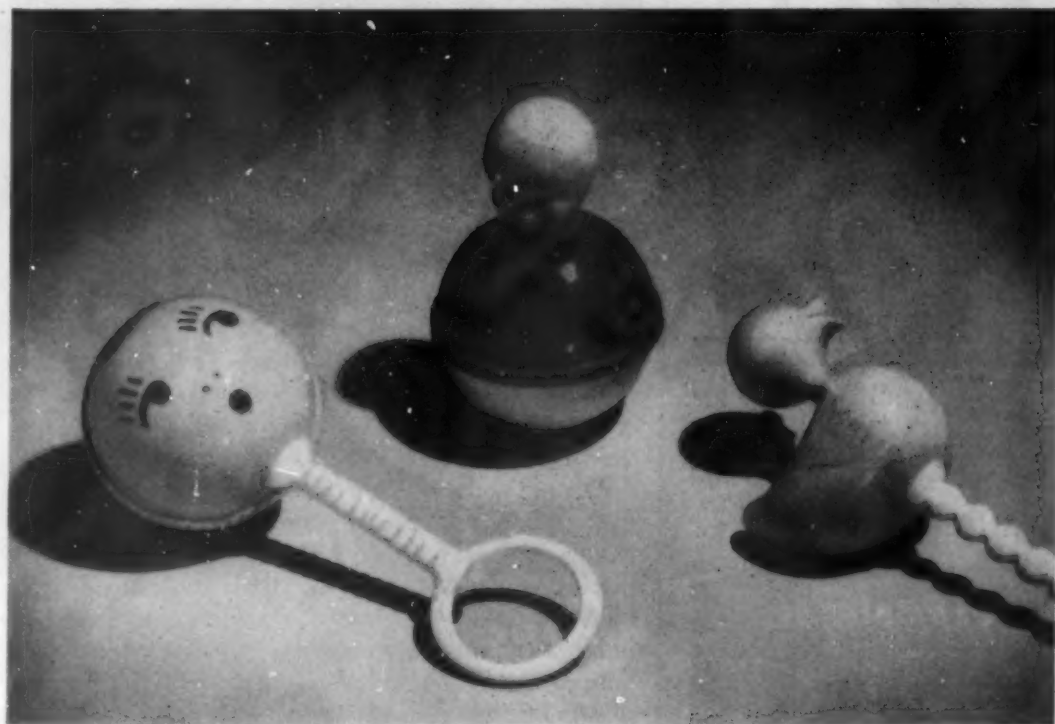
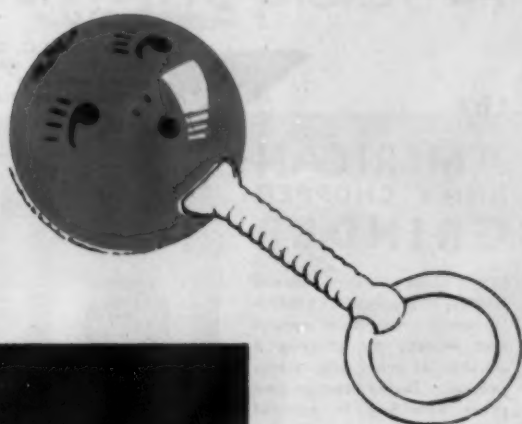
tray so it will not slip and slide about. Spoon, knife and fork avoid sharp points, corners and edges which might cause possible injury to a baby.

The name and address of the manufacturer who makes these stock molds is listed on page 190.

NIXON C/A for **B**aby **R**attles...

(CELLULOSE ACETATE)

PRACTICAL
COLORFUL
SANITARY
DURABLE



Nixon

C/N CELLULOSE NITRATE

C/A CELLULOSE ACETATE

E/C ETHYL CELLULOSE

Plastics

Injection molded by The Amloid Company of Rochelle Park, N. J., these clean, sanitary rattles will get a smiling reception in any nursery. NIXON C/A (Cellulose Acetate) is an ideal plastic for all injection-molded jobs. NIXON C/A (Cellulose Acetate) and NIXON E/C (Ethyl Cellulose) Molding Powders are available for prompt shipment. Like NIXON C/N (Cellulose Nitrate) they are also available in Sheets, Rods, Tubes, and Extruded Shapes. Call NIXON when you have a plastic molding or fabricating problem.

NIXON NITRATION WORKS • NIXON • NEW JERSEY

Representatives: New York, Chicago, Detroit, St. Louis, Leominster • Sales Agents: NORTHWEST PLASTICS INDUSTRIES: Portland, Oregon; Seattle, Washington
Canadian Distributors: CRYSTAL GLASS AND PLASTICS LTD. Toronto, Can. • Export Distributors: OMNI PRODUCTS CORP., 460 4th Ave., N. Y. 16, N. Y.

The Scrap Grinder for Efficient, Localized Operation...

the

AMERICAN KNIFE CHOPPER GRINDER

Many plastics operators are finding it profitable to localize scrap grinding of sprues and rejects by placing a crusher at every one or two presses. Bulky storage and extra handling to central grinding point is eliminated—grinder cleaning is reduced. The advent of the new smaller size American Knife - Chopper Grinder makes this operation particularly economical.



NOW

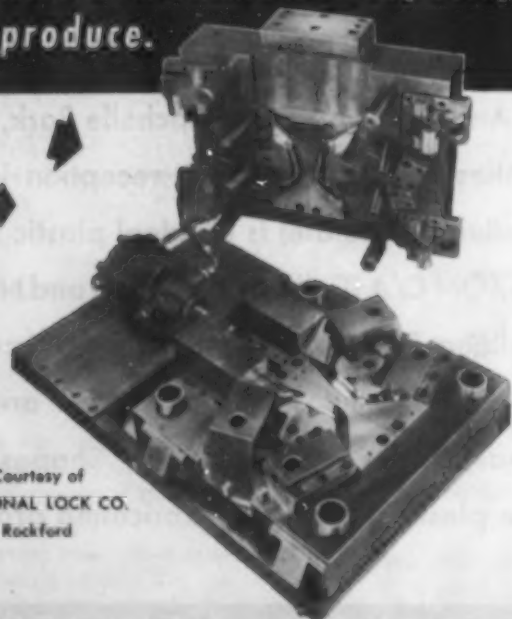
American K.C. Grinders are available in sizes to suit your operation... from 200 to 450 lbs. per hour.

Send today for illustrated bulletin: "Grinding Plastic Scrap Profitably."

American PULVERIZER CO.
Originators and Manufacturers of Ring Crushers and Pulverizers
1117 Macklind Ave.
St. Louis 10, Mo.

VERSATILITY AND PRECISION

... Another example of DANIELS-KUMMER'S capacity to produce.

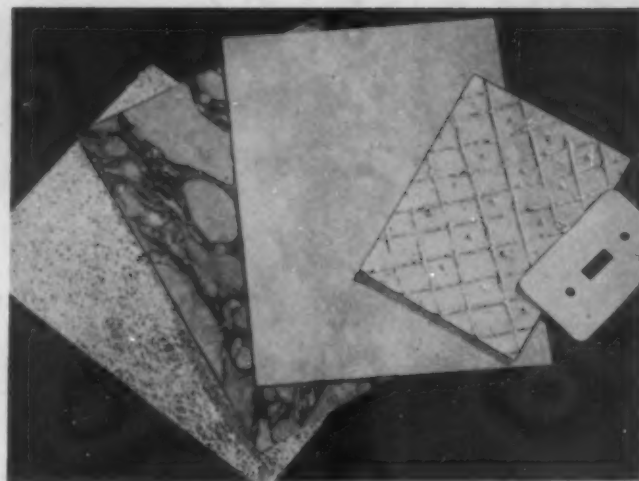


Courtesy of
NATIONAL LOCK CO.
Rockford

ENGINEERING • MOLD DESIGNING AND BUILDING • ENGRAVING

DANIELS-KUMMER ENGRAVING CO.

182 NORTH WACKER DRIVE • CHICAGO 6



A glass-mat material

SHEET materials for use in lampshades, screens and wall paneling are being mass produced and marketed by Polyplastex United, Inc., 92-35 Horace Harding Blvd., Elmhurst, L. I., N. Y., from specially designed glass-mat materials impregnated with a variety of resins. The resins are, in general, either polyesters or vinyls, but formulations are varied to provide required properties in the various sheet materials.

Any of the finer textured mat materials may be made with translucent properties for use in lamp shade fabrication, in panel lighting shields for use on ships and in display work, and for decorative applications where light transmission is required. They may be made both luminescent and translucent at the same time for use in lampshades for nurseries and faced with clear glass or plastic for light switch plates. This grade of material in any thickness is known as Synskyn. In the clear or natural form it has a rich texture and powdery translucence. Decorated by printing, painting or silk screening, it can be used for permanent wall surfacing.

Synglo is a sheet providing a more flashy translucence and used entirely for light radiation. Synspun, a thicker sheet, has a lace-like finish in which glass fibers are loosely woven and set with plastic. Its acoustic properties make it suitable to cover tile and boards.

Washable, flame resistant

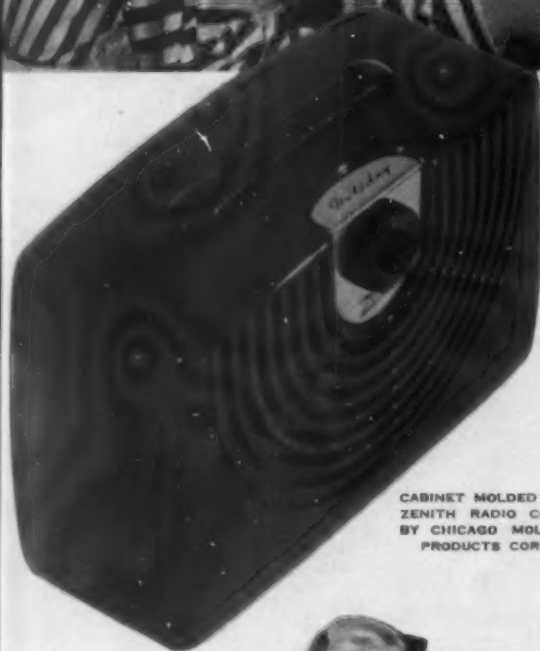
All of the materials may be glued and all can be made with pigmented resin or dyed after manufacture. All are washable and are guaranteed not to warp, wrinkle or sag. They may be made flame resistant. All except the acoustic sheets are pliable. Raised decorative effects may be produced by applying specially formulated resin or resin-metal decoration by hand.

The company's sales staff follows through on industrial applications and provides both information and merchandising assistance to accounts handling products fabricated from Polyplastex sheets.

STYRON! the right plastic!



REFRIGERATOR COURTESY OF NASH-KELVINATOR CORP.



CABINET MOLDED FOR
ZENITH RADIO CORP.
BY CHICAGO MOLDED
PRODUCTS CORP.

Right in Radios! Right in Refrigerators!

Development of polystyrene is one of Dow's greatest plastics achievements.
Production capacity of Styron has expanded 10 times over pre-war capacity.
Engineering assistance is a regular service of Dow and skilled molders.

Now see what Styron is doing: *Foremost* manufacturers—from radios to refrigerators—are using Styron (Dow Polystyrene) to better today's fine products. Established leaders are making these products more attractive with Styron's colorful beauty; more serviceable with Styron's lasting durability; more *salable* with Styron's adaptability to new design ideas. See the picture? Perhaps you also see what this can mean to products of your own. Styron's surprisingly low cost combines product improvements with important economies. If that's a combination you can use, just call the nearest Dow office.

50th Anniversary 1897-1947

"I PREFER PLASTICS in so many things!"

"Oh, yes, I'm plastics-minded!" says Miss Gloria Carlson, bride-to-be, of Detroit, Mich. "I love all that gleaming white Styron in the Kelvinator—so clean, so sanitary! And the Styron cabinet on the Zenith 'Holiday' radio is really stunning. Gorgeous color—lovely smooth feel! I'm always looking for new things in plastics!"

PLASTICS DIVISION • THE DOW CHEMICAL COMPANY • MIDLAND, MICHIGAN
New York • Boston • Philadelphia • Washington • Cleveland • Detroit • Chicago
St. Louis • Houston • San Francisco • Los Angeles • Seattle
Dow Chemical of Canada, Limited, Toronto, Ontario





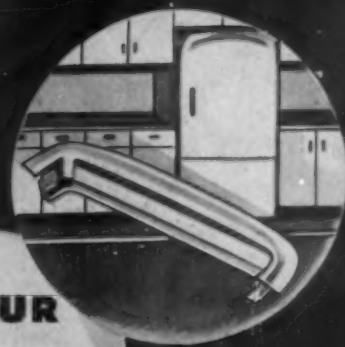
Plumbing fixtures

Washing machine agitators



Automobile instrument panels

IF IT'S A BIG PLASTIC PART...GENERAL AMERICAN CAN BUILD IT BETTER!



Refrigerator door trim

**YOUR
PRODUCT
?**

An impressive battery of the world's largest injection molding presses

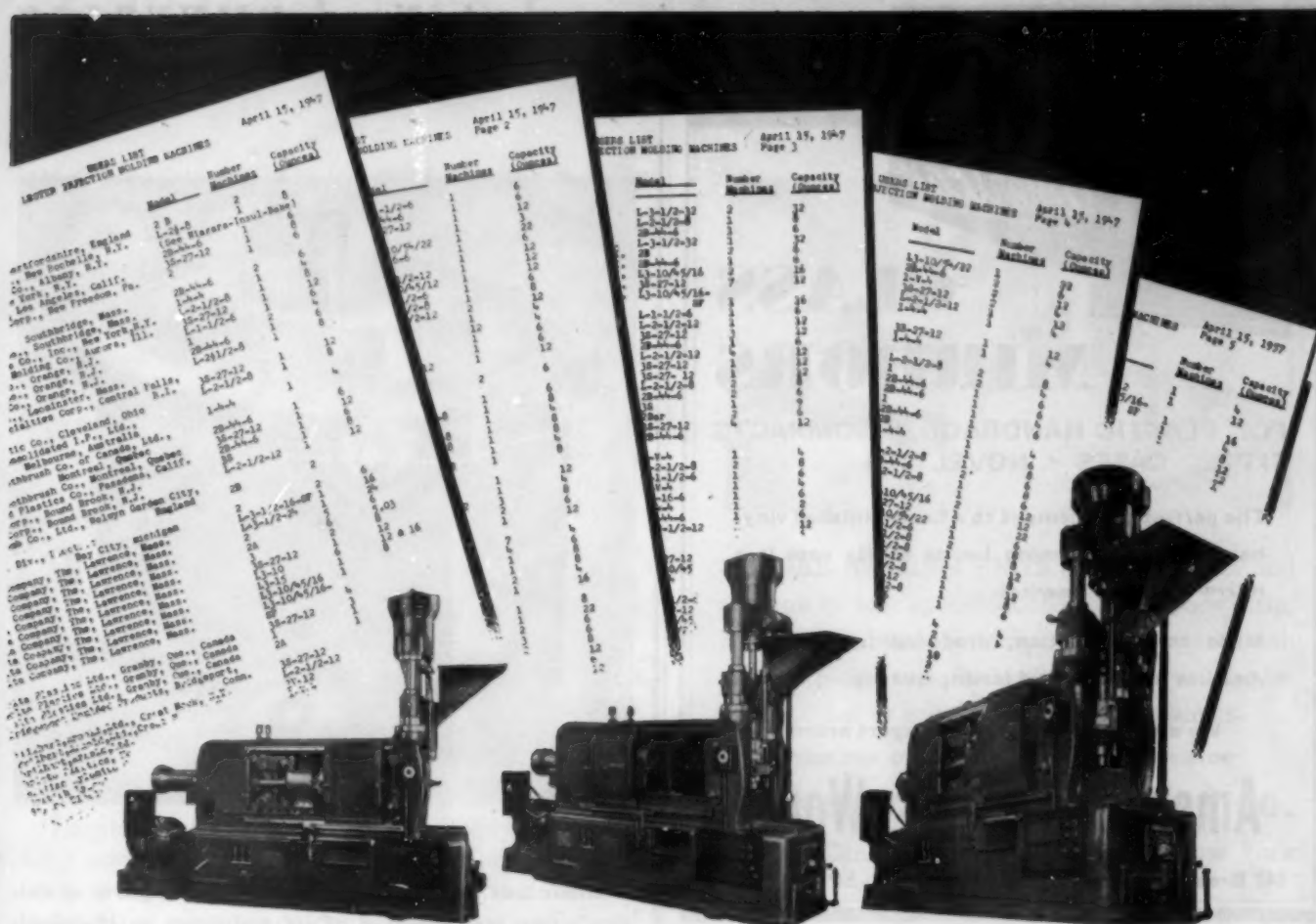


General American has the engineering skill, the creative imagination, and the equipment to manufacture large and complex plastic parts.

Waiting to serve you at General American are batteries of large-volume injection molding presses, including the 32-oz. type, and compression presses ranging up to 500-ton, 1000-ton and 2000-ton capacities. That means volume—a smooth flow of plastic parts to your production lines.

Submit your plastics problems to us for design, engineering and prompt quotations.

**PLASTICS DIVISION
GENERAL AMERICAN TRANSPORTATION
CORPORATION**
135 South La Salle Street • Chicago 90, Illinois



HAVE YOUR PLASTICS MOLDED

ON **LESTER MACHINES**

LESTER USERS LIST NOW AVAILABLE

PRODUCTION NOTE FOR PLASTIC BUYERS:

- Right now, there may be production time available right in your community on *new* LESTER injection molding machines. The owners of those machines are our customers — and if they need more work — on account of conditions in the industry — we are going to help them find it.
- Our users list, showing customer's equipment and capacity, is available to buyers of molded plastics. Ask for it. You can check it over and then send your inquiries to shops that can handle your work. Get figures on LESTER-molded products before you buy.

Write for the LESTER users list today.

This is the second of a series of LESTER-PHOENIX advertisements in the interest of our customers...the nation's best plastic molders.

NEW YORK
CHICAGO
LEOMINSTER
CINCINNATI
LOS ANGELES
SAN FRANCISCO



INJECTION MOLDING MACHINES

Distributed by LESTER-PHOENIX, INC.

2621 CHURCH AVE., CLEVELAND 13, OHIO



GLASS MIRRORS

FOR PLASTIC HANDBAGS • COMPACTS
FITTED CASES • NOVELTIES

The perfect complement to a finely-finished vinyl handbag or a gleaming Lucite vanity case is a mirror made by American.

Made to specification, produced in quantity, American mirrors are of lasting quality.

We are equipped to handle export orders.

American Mirror Works

Established 1918
648 Broadway, New York 12, N. Y.

SPring 7-1889

THERE IS NO CHARGE FOR
This Generous Sample

If industrial skin irritations are among your problems, let us send you literature and a generous sample of Tarbonis. In many a plant in your industry Tarbonis (liquor carbonis detergens in a vanishing type cream, odorless, greaseless, non-staining and non-soiling) has proved a remarkable aid against reactions from many irritants and reagents used in industry. Leaves no trace upon the skin, does not interfere with work. It may solve your problem, too.

Send for a sample of Tarbonis NOW.

THE TARBONIS COMPANY

4300 Euclid Ave. • Dept. MP • Cleveland 3, Ohio

Please send TARBONIS sample and literature to:

Company.....

Address.....

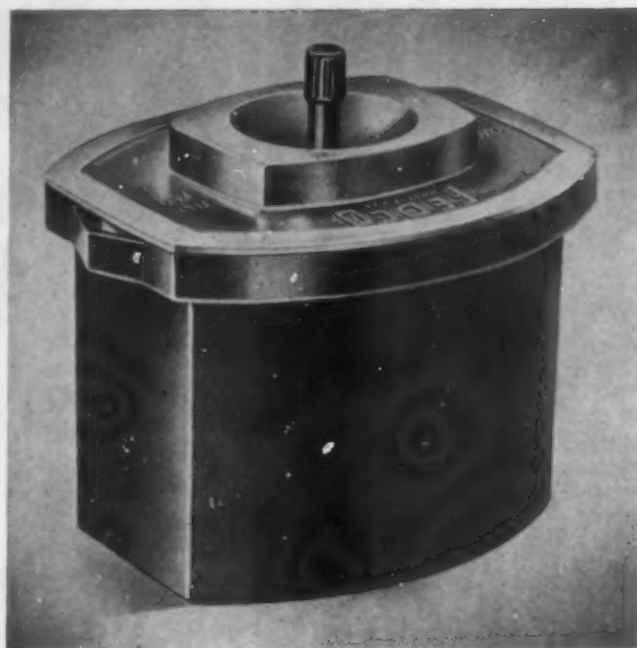
By.....Dept.....



**Are These
the Irritants?**

Cutting Oils
Chrome Dyes
Formaldehyde
Sodium
Bichromates
Lime
Metal Dust
Chemicals
Urea and Phenol
Plastic Compounds
Brine
Acid-Type Foods
Foodstuffs
Reagents
Naphtha
Soaps
Detergents

A New PHENOLIC



Phenolic was selected for four of the seven parts of this developing tank because of its resistance to chemicals

A HANDY piece of dark room equipment, this tank for daytime developing of film packs and cut film, is molded of phenolic. Its obvious advantages of being unaffected by photographic chemicals, having economy of price and ability to do a good developing job will undoubtedly be recognized by photographic fans. To Plastic Products Inc., the molder, S. Norwalk, Conn., and to Fedco Products Co., the manufacturer, 37 Murray St., New York City, goes the credit for the development of this tank.

Molding the tank

Four of the seven parts of the tank—container, cover and two-piece reel—are compression molded of Resinox or Bakelite. The single-cavity molds for the container and the cover are complicated by the fact that the container has a recessed light-trap channel around the upper edge of the molded piece, at each end of which are pouring lips.

The cover is made to fit into the container channel and has corresponding pouring lips. A raised funnel is molded in top of the cover. The cover, incidentally, is bright red—the only part that deviates from the black color of the tank.

A two-piece reel for the tank is made in a 2-cavity mold. Both halves of the reel are of the same dimensions except for the hubs. Here an allowance has been made for one hub to fit into the other. Indexing notches

photographic tank

are molded into the hubs to permit adjustment of the reel to various film sizes.

Each end of the reel is provided with a dozen molded-in slots. These slots are molded with precision so that those at one end accurately correspond in position to the slots at the other end of the reel—a precaution which keeps films from touching each other during development. After the molding of these parts, the flash is removed from the slots by a punch fixture.

The fifth component of the tank—the agitator—is also plastic. It is cast of Marblette, 42 agitators being turned out at one time.

The remaining tank parts are metal and consist of a feeder, used to thread the strips of film into their proper slots, and a clip which assists in keeping the reel hubs properly adjusted to film sizes.

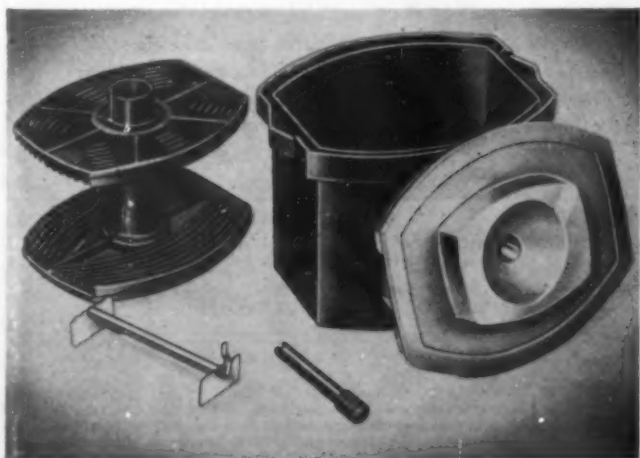
Made to accommodate films ranging from 2½ by 3¼ to 4 by 5 in., the new tank is compact and requires only 48 oz. of developing solution.

Serviceability of plastic tanks

The plastic photographic tank has already been in use for a number of years. Its chief advantage lies in its resistance to chemicals. This is important because chemicals of most any description, not necessarily used in the developing process, are apt to spill on the tank. If the chemicals were harmful and could not be easily washed off the tank, the films thereafter developed might be ruined.

These tanks have been found to stand up well under the conditions of normal use where the greatest danger is that the unit will be dropped. However, even if the tank is allowed to fall to the floor it is said not to break if dropped from a 2- or 3-ft. height.

The four phenolic parts are the container, cover and the two-piece reel. The first two parts are molded in single cavity molds; the reel is turned out in a two-cavity die



ELECTRIC HEATING EQUIPMENT

for the Plastics Industry



SPECIAL HEATING UNITS (illustrated) size and wattage to your specifications. Also space strip, hinged-type band, cartridge and immersion heaters, hot plates and pre-heating ovens—for the industry. Let us solve your heating problems.

SEND FOR OUR NEW ILLUSTRATED CATALOG

GLENN ELECTRIC HEATER CO.

239-241 Canal Street New York 13, New York

PLASTICS

**ENGINEERED TO SAVE YOU
MONEY AND TROUBLE!**

**Designed to Reduce Mold Cost
and Production Time!**

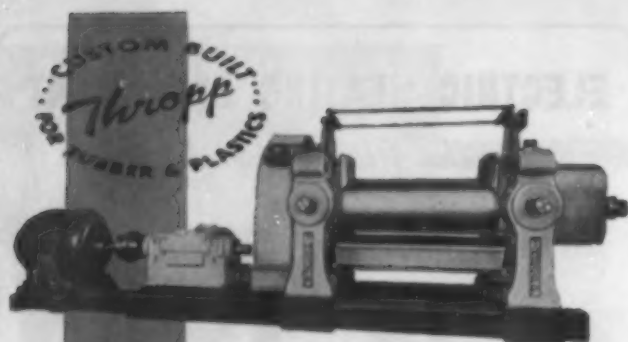
Your mold costs can now be greatly reduced with the help of our expert engineering department, which is geared to analyze design problems of industrial products and reduce your initial outlay. Blueprint detail is submitted for your approval and every step in the production of your product is carefully mapped out and controlled in our efficient factory. Call us in . . . compare our methods with your present methods. Phone or write us for information.



INDUSTRIAL PLASTIC CO.

3724 W. 38th Street • Chicago 32, Illinois

a division of INDUSTRIAL ABRASIVES, Inc.



New Hi-Speed MILLS

22" & 22" x 60" Extra Heavy Duty

Extra Heavy Duty Individual Motor Driven Mill with 15" diameter journals, having 150 H.P. enclosed herringbone gear drive. Machine is equipped with solid bronze lined bearings having oil closure seals on side of the boxes facing the rolls to prevent oil contamination of the stock. Steel cut connecting gears and Johnson Rotary Joints. Manual mechanical lubricator and new style guides bored to fit the rolls. This is just one of the many new Thropp precision built mills designed to speed up post war production.

West Coast Representative
H. M. Royal Inc.
Los Angeles, Cal.

Thropp

WM. R. THROPP & SONS CO.
Trenton, N. J.

COTTON FABRICS

FOR REINFORCING
PLASTICS

J. H. LANE & CO., Inc.

250 W. 57th St. New York, N. Y.

Consumption of

THESE statistics represent the consumption of plastics and synthetic resins as reported by 82 manufacturing companies. The decline in thermoplastics consumption, which started in March, continued in May with cellulose acetate and mixed ester plastics molding materials off about 1,000,000 lb. from April and little more than half the peak production of 8,000,000 lb. in December 1946. Acetate sheeting of over 0.003 gage was slightly up. Polystyrene

PLASTICS AND SYNTHETIC RESIN PRODUCTION From Statistics Compiled by Bureau of

Materials

Cellulose acetate and mixed ester plastics^a

Sheets

Continuous (under 0.003 gage)

Continuous (0.003 gage and upward)

All other sheets, rods and tubes

Molding and extrusion materials

Total

Nitrocellulose plastics^a

Sheets

Rods and tubes

Total

Other cellulose plastics^{a, b}

Phenolic and other tar acid resins

Laminating (dry basis)

Adhesives (dry basis)

Molding materials^c

All other, including casting (dry basis)^{c, d}

Total

Urea and melamine resins

Adhesives (dry basis)

Textile and paper treating (dry basis)

All other, including laminating (dry basis)^{c, d}

Total

Polystyrene^{a, e}

Vinyl resins

Sheeting and film, including safety glass sheeting^c

Textile and paper coating resins (resin content)

Molding and extrusion materials (resin content)

All other, including adhesives (resin content)^c

Total

Miscellaneous

Molding materials^{a, b}

All other (dry basis)^{a, b}

Total

Grand Total

^a Includes fillers, plasticizers and extenders. ^b Includes methyl and ethyl cellulose and related plastics. ^c Data cannot be published without disclosing operations of individual establishments. ^d Includes operations of two companies reporting for the first time in May; however, this does not appreciably affect the comparability with previous months. ^e Excludes data for protec-

plastics materials

was off about 250,000 lb. from April and down about 500,000 lb. from the peak 1947 figure of 7,400,000 in January. Vinyls took a severe drop of 3,000,000 lb. with greatest decline in molding and extrusion materials. In contrast to the thermoplastics, phenolic molding powder reached its greatest production, and resin for laminating varnish shows continuous increase. The two companies added to the phenolic production report did not appreciably affect comparisons.

IN POUNDS FOR JAN. THROUGH MAY 1947
Common Industry Division, Chemical Unit

April 1947	May 1947	Totals for first 5 months—1947
lb.	lb.	lb.
738,552	663,256	3,587,574
581,652	668,547	2,948,964
441,465	357,679	1,926,107
5,357,103 ^b	4,316,753	30,873,281
7,118,772	6,006,235	39,335,926
937,101	777,782	4,457,629
392,243	274,299	2,068,055
1,329,344	1,052,081	6,525,684
331,455	"	1,685,554 ^b
3,590,468	4,015,364	17,407,742
1,952,870	1,944,834	8,826,912
15,088,906 ^f	16,508,733 ^d	74,617,276
5,652,425	4,941,444	30,036,982
26,284,669 ^j	27,410,375	130,888,912
4,187,095	3,876,904	20,021,294
1,482,914	1,556,831	7,681,251
615,180	668,464	3,749,526
6,285,189	6,102,199	31,470,071
7,096,129	6,854,145	34,906,973
5,980,883	4,430,884	27,592,650
1,424,463	1,431,879	6,128,029
6,890,397	5,777,376	31,735,882
2,020,746	1,485,663	11,938,874
16,316,489	13,125,802	77,395,435
4,920,323	4,188,842	26,116,606
3,354,600 ^f	3,217,810	13,574,560
8,274,923 ^f	7,406,652	39,691,166
73,036,970 ^f	67,957,489	361,899,721

tive coating resins. ^f Excludes urea and melamine molding materials. see footnote A. ^g Dry basis, including necessary coloring material. ^A Includes data for urea and melamine, acrylic acid and miscellaneous molding material. ⁱ Includes data for petroleum resins, acrylic acid ester resins, mixtures and miscellaneous synthetic materials. ^j Revised. ^k Total, Jan.-April only.

So Simple Anyone can
ENGRAVE
on Plastic and Metal



**NEW
HERMES
PORTABLE**

The handy, accurate machine that every plant
NEEDS for speedy production lettering of name
plates, small panels, novelties, serial numbers,
part numbers, etc.

NEW HERMES, INC.
13-19 University Place • New York 3, N. Y.

YOUR plastic problems are
not **UNUSUAL** to us

End trial and error methods . . .
let our 60 years of plastic know-how
show you the way. Quotations
submitted without obligation.

INJECTION AND EXTRUSION MOLDING
MECHANICAL PRESS FORMING
A COMPLETE DESIGNING SERVICE
MODERN TOOLROOM SERVICE
MACHINING, ASSEMBLING AND FINISHING
FABRICATION OF SHEET MATERIALS

EST. 1887
E.B. KINGMAN & CO.
LEOMINSTER • MASS.

MORE THAN

100

LEADING MOLDERS USE

AIRTRONICS

DUAL PREHEATERS



ILLUSTRATED LITERATURE AND COMPLETE INFORMATION UPON REQUEST.

AIRTRONICS MANUFACTURING CO.
NATIONAL SALES & SERVICE

New York, 31-28 Queens Blvd., Long Island City, Zone 1

Chicago, 3810 Broadway, Zone 13

Los Angeles, 4536 Cutter St., Zone 26

Plastics Treating of Paper and Fabrics



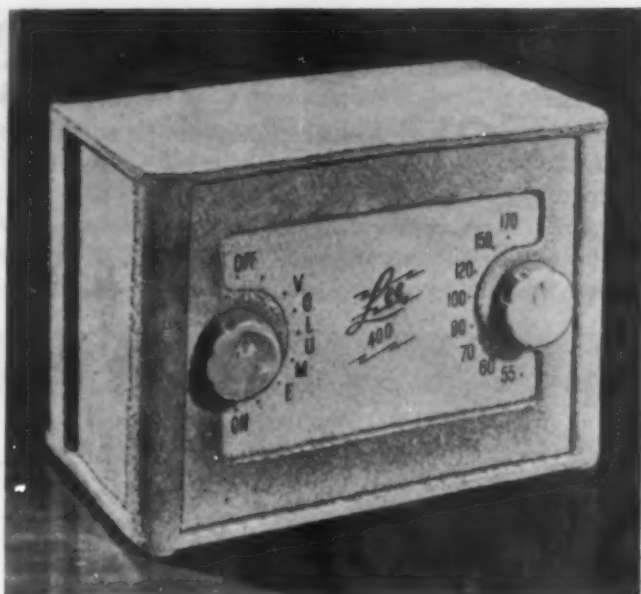
Write For This Catalog 112

Devoted to a general description of the modern equipment being designed and built for the treating of fibre mass with synthetic resins or plastics to produce the many new coating, treating and casting materials.

Prominent users include: A. C. Spark Plug Co., Bakelite Corp., Formica Insulation Co., General Electric Co., Phenolite Co., Synthene Corp., Taylor Fibre Co., Westinghouse Electric & Mfg. Co., and many others.

JOHN WALDRON CORP.
Main Office and Works
New Brunswick, New Jersey
MACHINES

A radio case of



PHOTOS, COURTESY UNITED STATES PLYWOOD CORP.

This new small radio features a cabinet of veneer-kraft laminate. This cabinet is sprayed with a varnish-adhesive, then with rayon filaments to give variety of colors

WANTED — a small radio in a wide range of colors which could be mass produced to permit its intended low cost. The result is the Lee 400, a 4-tube, tuned radio frequency type radio, which retails for \$12.95 and has an anticipated sale for the season of 150,000 units. Weighing 3 1/2 lb., the radio is 7 1/2 in. long, 5 1/4 in. high and 4 3/16 in. deep.

Designed by Herbert Friedman of Lee Radio Co. of 1331 Halsey St., Brooklyn, N. Y., this new radio is the first to have a cabinet made entirely of Tekwood, a veneer-kraft laminate. This laminate consists of two layers of heavy cylinder kraft bonded to a core of hardwood veneer and is said to be sturdy enough to sustain weight up to 300 pounds. Like plywood, it gains its strength from cross-grained, laminated three-ply wood and paper layers. It is more flexible, however, than plywood.

This cabinet, together with the production methods that are used, explains in part why the company is able to produce the Lee 400 at such a low cost.

Special jig speeds construction

Parts for the cabinet are die-cut from sheets of Tekwood and shipped to Lee's in flat form. They are removed and placed in a special jig which permits simple and rapid construction of the cabinet. Solid wooden posts are placed in the corners of the square-type cabinet, only other material used excepting some drive screws, a wire grille and a baffle backing for the grille. The corner posts are prerouted and the Tekwood forms, manufactured by the United States Plywood

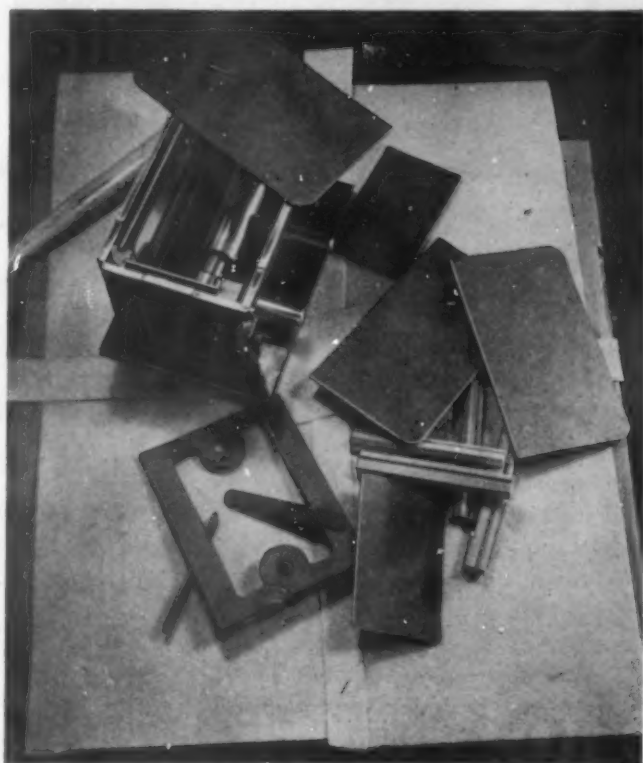
veneer-kraft laminate

Corp., 55 W. 44th St., New York City, fit into slots. Top, four sides and bottom are assembled with screws. Two support strips of Tekwood are then attached to the bottom by means of glue and screws.

Variety of color combinations

When finished, the cabinet is sprayed with a special varnish-adhesive developed by Mr. Friedman. Before this adhesive is dry the cabinet is sprayed with rayon flock, $\frac{1}{32}$ or $\frac{1}{16}$ in. in length and supplied by Claremont Waste Mfg. Co., Main and Elm Sts., Claremont, N. H. After drying, the surplus rayon filaments are

Cabinet components are shown here. The solid wooden posts, which are prerouted, are placed in cabinet corners



The parts of the radio cabinet are assembled in a special steel form which was designed to speed up production



SPEED-PRINTZ

Gold Stamping Machine

the name
tells the
story

STAMPS NAMES,
INITIALS,
TRADE-MARKS

on plastic items.

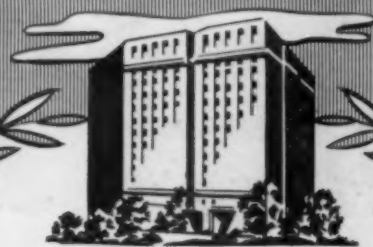
Send Samples of Plastic
for further information



Immediate delivery

WILSON GOLD STAMPING
MACHINE COMPANY

1855 HILLHURST AVE., HOLLYWOOD 27, CAL.



DETROIT'S "FIRST"

IN CONVENIENCE · COMFORT · QUALITY

In the heart of the downtown, office, theater, and shopping area. Friendly, courteous service to make your stay in Detroit a pleasant memory. The Tuller Coffee Shop or Cafeteria for excellent Food modestly priced. The Hotel Tuller, Detroit's largest, is the place to stay.

VISIT OUR *Cocktail Lounge*
ONE OF DETROIT'S FINEST

800 ROOMS WITH BATH FROM \$2.75

Hotel Tuller

FACING GRAND CIRCUS PARK
RICHARD C. HODOES, Manager

MOLDING: POWDERS:

cellulose acetate
cellulose acetate
butyrate
ethyl cellulose
polystyrene
available in
all colors
or
crystal-clear

Franklin Jeffrey—a new source for molding powders—but an old hand at the job. With a background of 16 years in the manufacture of plastic molding powders, we're at your service to provide you with the best materials.

FRANKLIN JEFFREY
CORPORATION

1671 McDonald Ave. ESplanade 5-7995 Brooklyn 30, N. Y.



IN THIS PLANT we have developed the technique that enables us to serve as consulting engineers covering every detail—from the designing of products suitable for manufacture in plastic, through every phase to the finished product.



New England
Representatives
LESTER Injection
Molding Machines

STANDARD TOOL CO.
LEOMINSTER, MASS.

Outfitters to  *Plastics Mfrs.*
Since *1911*



This bottom view of the now assembled cabinet shows two support strips. These are attached by glue, screws



Rayon filament flock is applied by air gun to cabinet. Grille is sprayed in contrasting color, later inserted

air-brushed off the cabinet. The color of this coating can be made to blend with any decorative color scheme, and further, can be made to give double color effects. For example, a cabinet sprayed with red adhesive and gold rayon will appear red when viewed from one direction, gold from another direction and red-gold from still another angle. According to the company, some 400 color combinations are available.

Wire grille is similarly sprayed, usually with a white rayon flock. The radio's name, station identification, etc., are then silk screened on in black. The beige knobs are injection molded of cellulose acetate in a 12-cavity mold by Plastic-Ware, Inc., 238 William St., New York City. The gold leaf arrow is later stamped on these knobs.

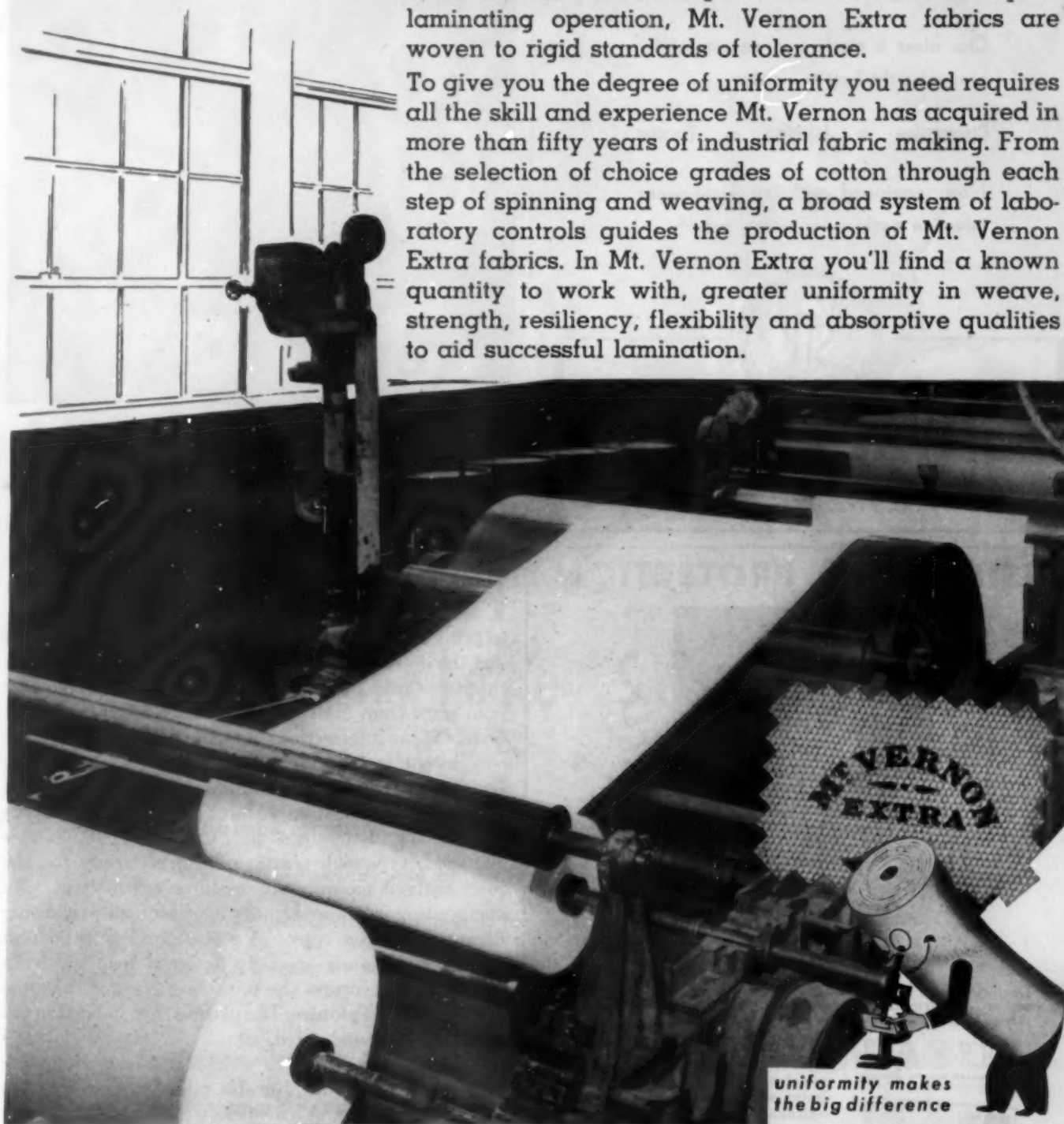
Simplified assembly line

Simplified production of the radio set itself also helps cut cost. Instead of having the radios on an assembly line with one worker inserting one small piece of the set, parts for the Lee 400 are assembled to some extent before the radio reaches the main assembly line. Fifteen subassemblies can be placed in as units and then simply wired together. This radio set is installed into the Tek-wood cabinet with no screws on the bottom. All screws for attaching it are on the back.

Fabric Uniformity Aids Successful Lamination

Because fabric uniformity is vital to the success of your laminating operation, Mt. Vernon Extra fabrics are woven to rigid standards of tolerance.

To give you the degree of uniformity you need requires all the skill and experience Mt. Vernon has acquired in more than fifty years of industrial fabric making. From the selection of choice grades of cotton through each step of spinning and weaving, a broad system of laboratory controls guides the production of Mt. Vernon Extra fabrics. In Mt. Vernon Extra you'll find a known quantity to work with, greater uniformity in weave, strength, resiliency, flexibility and absorptive qualities to aid successful lamination.



uniformity makes
the big difference

Mt. Vernon-Woodberry Mills

TURNER HALSEY

COMPANY

Selling Agents

40 WORTH ST. • NEW YORK

Branch Offices:

CHICAGO

•

ATLANTA

•

BALTIMORE

•

BOSTON

•

LOS ANGELES

•

AKRON

AUGUST • 1947

173

PLASTIC MOLDS

25 years experience in designing and building molds for leading molders.

Our plant is modern in equipment for producing the best in molds.

Compression • Injection • Transfer

Now equipped with an eight-ounce injection machine for testing molds!



FORTNEY MFG. CO.

INCORPORATED

247 N. J. R. R. Ave.

Newark 5, N. J.

VISIBILITY... PROTECTION



COUNTER DISPLAY
FOR RCA VICTOR

Deep drawn to a depth of 9" from one piece of plastic... no seams... permitting unmarred visibility and full protection, this counter unit is another WLS SEE-ALL plastic achievement.



In our complete, new, modern plastic department, skilled professional model makers and master craftsmen design and create displays that sell merchandise.

RATES REASONABLE

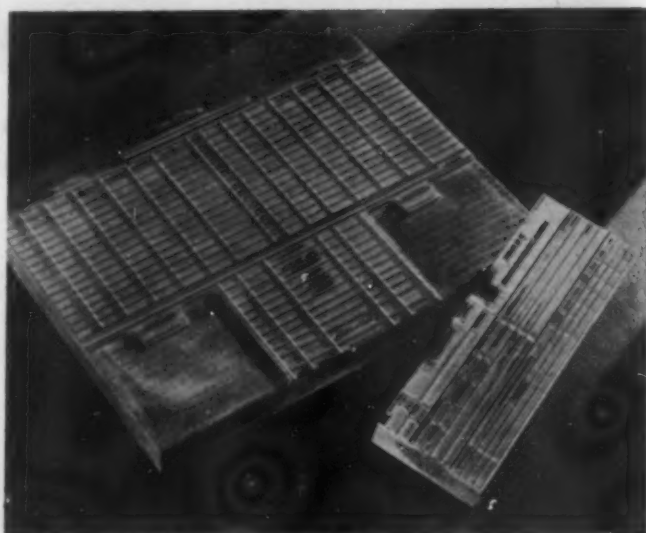
Reviewed in illustrated catalog just off the press describing new techniques and designs. Free! Send for your copy today.

America's Largest Organization Specializing in Merchandise Presentation

W. L. STENSGAARD AND ASSOCIATES, INC.
368 N. JUSTINE ST. • CHICAGO 7, ILLINOIS



Cast phenolic ruled printing plates



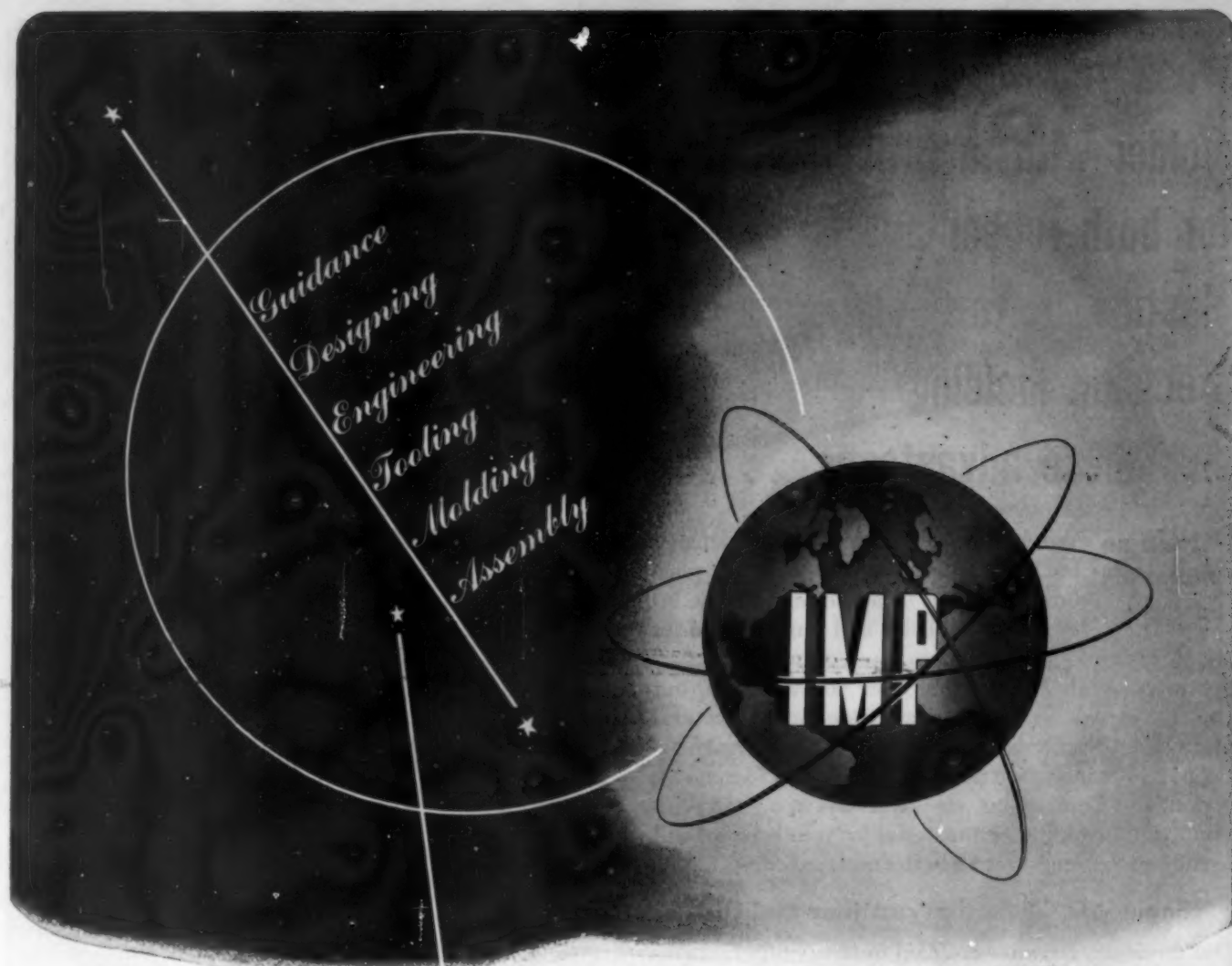
PHOTO, COURTESY DUREZ PLASTICS AND CHEMICALS INC.

Phenolic casting resin, cast on a wax engraving, is being used to produce cross-ruled charts more simply, easily

IN LETTERPRESS form printing there are two standard methods of printing ruled forms to obtain solid lines. One method is to double print, that is, to print the cross lines the first time through the press and the down lines the second time. The drawback is that these rules must be hand set. The second method is to print from plates—the chief difficulty here being breaks at the intersections of the lines.

A recent innovation said to overcome these main faults of double printing and previous plate printing is Plasticplates made from a Durez casting resin by Wells & Co., 633 Plymouth Court, Chicago 5, Ill. These are solid, type-high plastic rule forms ready for the press without mounting on wood or patent base. No composition is required from the printer, all work being done entirely from copy. A wax engraving of the form is first made on a specially designed machine by a method which insures the printing surface of the plate being in perfect plane. The plate is then molded in the wax engraving and cured.

The casting resin from which the Plasticplates are made cures into hard, durable plates reproducing the smallest type or finest hairline. The plates do not warp shrink, stretch or crack. They weigh only $\frac{1}{8}$ as much as a solid metal form and permit higher press speeds. Lines on the form can be set at any angle and have no breaks at the joints. As all lines and type are in a perfect plane, printers report that almost no make-ready is necessary. The plates can be easily stored as they are unaffected by heat or moisture.



Complete Service

We offer a complete service that makes your plastics problems quite simple. We will help you in your original planning. We will help you design your plastic product and engineer it for most efficient production. Our tooling service frequently saves time and money and, of course, we work with all types of materials in both large and small dimensions. Our Injecto-Compression technique is hard to beat. We even complete the job for you with coloring and assembly, if you want it.

INTERNATIONAL MOLDED PLASTICS, INC.

4387 West 35th Street, Cleveland 9, Ohio

Chicago office: 20 N. Wacker Drive, Phone: Andover 5620 • New York office: 1270 Broadway, Phone: Pennsylvania 6-3290
 Detroit office: 3-244 General Motors Bldg. Phone: Madison 4124 • Philadelphia office: 941 Drexel Bldg. Phone: Walnut 3544
 St. Louis office: 718 Louderman Bldg. Phone: Garfield 2464

When you select a molder with facilities for both rubber and plastics... you get precision molding plus these advantages...

Help on materials selection

We have research and manufacturing facilities for both rubber and other plastics. This gives us an unusually wide interest in the field, and our laboratories test new developments in both types of materials.

Starting with hard rubber over 60 years ago, our molding experiences now cover a wide range of natural and synthetic rubbers, thermal setting and thermal plastic materials, including new plastics, such as Plexene M, Nylon, and Cerex. Thus, we are always in a good position to advise on the best material for your product and to suggest a change when a better material comes along.

Engineering help that cuts time and cost

Our engineers have been called in frequently by manufacturers during the early design stages of their products. In many instances, they have been able to suggest design changes which cut molding and other manufacturing costs.

Time and again they have pioneered in cost-reducing molding techniques. Our staff was the first to develop injection molding of thick cross sections. That cut the cost of manufacturing brush blocks, for instance, as much as 50%. Previously, brush blocks were cast or cut from sheets, and attempts to injection mold any of them with cross sections over $\frac{1}{2}$ " in thickness had resulted in incompletely filled cavities, bubbles, flow lines, surface failures, and other flaws. Our engineering staff redesigned the molds and worked with the machinery manufacturers on necessary machine changes, all of which resulted in considerable savings in time and money to the customer.



Fine for plastics—Cellulose-Acetate Butyrate for stability and moisture resistance was chosen. This valve cap, with special dirt protector, involved an intricate die design and precision molding, as threads had to fit easily on assembly without further machining.



Fine for rubber—Hard rubber for dielectric strength, high temperature characteristics and moisture resistance was chosen for this magneto housing—an intricate precision molding job involving inserts.

Let's get together on your problem

If you are planning or using large quantities of a molded product, chances are that our experience and facilities for volume production will enable us to fill your needs at a reasonable cost.

PLASTIC USERS PLEASE NOTE
Injection molding capacity available

Another section of our expanding plastics facilities has been completed. The latest model Watson-Stillman, Impco, and Lester injection molding presses—8, 12, 16 and 22 ounce capacity—are ready to go to work for you. If you would like a sales engineer to call and discuss your needs, please write Dept. A-4.



VULCANIZED RUBBER AND PLASTICS COMPANY

formerly . . . The Vulcanized Rubber Company

Manufacturers of Rubber and Molders of Plastics

General Offices: 4 East 29th Street, New York 16, New York

Works: Morrisville, Pa.

LEA

METHOD

COMPOSITION

PRODUCT ... Styrene Buttons

OPERATION ... "Breaking" Sharp Corners

SAVINGS ... 30% in Production Time

The Quinn-Berry Corporation, Erie, Penna., manufacturers of quality plastic products, has this to say about the LEA Method and LEA Composition: "We originally finished the styrene buttons in two, or what actually may be described as three, operations: spinning, cut buffing to remove the rough surface caused by spinning, then finish, or, as we believe you describe it, 'color-buffing.' When we changed over to LEA Composition, the abrasive action was so fast that we eliminated the spinning completely and were able to maintain the same cutting and polishing speeds, thus saving approximately 30% in production time. Another grade of your composition was used for 'color-buffing'."

If the "breaking" of sharp corners or the removal of sprues, fins or residual flash are steps in your production line, why not consult LEA? The LEA Method may save you time, cut costs per piece and improve the quality of the finished product.



THE LEA MANUFACTURING CO.

*Burring, Buffing and Polishing . . . Manufacturers and Specialists
in the Development of Production Methods and Compositions*

16 CHERRY AVENUE, WATERBURY 86, CONNECTICUT

PROCESS STEAM . . .



from a
SOURCE
tailored to
YOUR
REQUIREMENTS

That's the KANE Low Water line Automatic Gas-Fired Boiler, 1 to 5 H.P.—ideal for your individual moulding presses. Built to order for the operating pressure you require. It is compact . . . saves floor space . . . can be placed right next to the press it serves, permits gravity return of condensate . . . eliminates long pipe lines and traps, burns fuel only in proportion to the steam used. (For your multiple press installations, there's the KANE Standard Boiler, 1 to 30 H.P.) and M-K-O Condensate Return System.

MEARS-KANE-OFELDT, INC.

1003 - 10 EAST MICHIGAN STREET PHILADELPHIA 25, PA.
FOUR DECADES OF AUTOMATIC GAS-FIRED BOILER MANUFACTURING EXPERIENCE



Quality . . .
COMES FIRST

During the past eight years nationally known manufacturers have entrusted Northwest Plastics with their molding problems. Fast modern equipment plus the latest and best in materials and techniques enables Northwest to meet any plastic problem you may have. • Our modern engineering and laboratory facilities combined with our many molding methods assure you that your job will be given preferred attention. Phone or write us today for complete information . . . Northwest Plastics, Inc., 2239 University Avenue, St. Paul, Minnesota.

Compression molding • Transfer molding • Injection molding • Modern Tool and Die Department • Finishing, Fabricating and Assembling Department • Laboratory for Development and Production Control • Engineering and Product Design

NORTHWEST PLASTICS inc.
ST. PAUL 4, MINNESOTA • PHONE MEster 9691
CHICAGO OFFICE • 612 N. MICHIGAN BLVD. • PHONE SUperior 9109



PHOTO, COURTESY ROHM & HAAS CO.

Tissue embedded in acrylic by the process described here maintains perfect form and shows minimum color loss

Specimens in acrylic

ACTUAL specimens of animals and soft tissues are essential in the teaching of biological sciences. This is particularly true in medical sciences such as anatomy and pathology, but the preservation of such specimens has always presented a difficult problem.

One solution to this problem seems to lie in embedding specimens in acrylic by a process developed by Dr. Max M. Strumia and Dr. J. Ivan Hershey of Bryn Mawr Hospital, Bryn Mawr, Pa., in cooperation with Rohm & Haas Co.

In the past, the most usual method of preserving organs or slices of organs has been by fixing these specimens in various fluids, usually containing formalin, with the addition of substances designed to retard as much as possible the loss of color and to prevent shrinkage. Customarily mounted in glass jars, specimens preserved in this manner are generally unsatisfactory for a number of reasons. After a few months or a few years, the specimen is almost completely bleached. Shrinkage occurs with deformity of the specimen, making identification difficult even after a relatively short period of time. The glass jars are too bulky and fluid must be added from time to time because of the difficulty of sealing the jars perfectly. Too, the preserving fluid often becomes discolored or turbid.

Nearly all these disadvantages can be eliminated by embedding the organs and tissues in a transparent plastic such as Plexiglas.

In earlier procedures, using acrylic resins, hard insects and similar structures were dehydrated by chemical means. This was not applicable to delicate fleshy ani-

mals or organs of animals without considerable loss of form and color. Recent laboratory studies have shown that when water is removed by sublimation from the frozen state by means of a high vacuum, the most delicate cytological structures are preserved. Blood plasma was prepared in this manner during the war. This principle of removing moisture is used in new process.

The first step is freezing of fresh unfixed organs or slices of organs in such a way as to cover them completely with ice. The water is removed (to less than 1 percent) by means of sublimation of the water vapor from the frozen state with the aid of a high vacuum (100 micra of mercury or less) and by condensation of the water vapor at -40 to -50° C. This phenomenon is similar to that observed on a very cold winter day when wet laundry is placed outside to dry. Although the wet garment freezes and remains frozen, it is found, after a period of time, to be perfectly dry because the water vapors have condensed on colder objects nearby.

The spaces left by removal of the water from the specimen are filled by means of a vacuum with liquid acrylic monomer. The specimen is then placed on a preformed base of clear acrylic and covered with successive layers of monomer which has been heated until it is partially polymerized. This process is continued until the tissue is completely embedded.

The monomer containing the specimen is then placed in an oven at 45° C. until it is completely polymerized into a solid crystal-clear block of acrylic. Machining and polishing of the block are the only other steps necessary. If desired however, the block may be cut.

Tissue embedded in this way maintains perfect form, shows very little color loss and can be readily handled for close observation. Various sizes of organs and tissues of both human and animal type have been embedded successfully and have remained unchanged for over a period of four years.

First step in embedding specimens is to freeze fresh unfixed tissue. Water is then removed and spaces filled with liquid acrylic monomer. Specimen is then covered with successive layers of partly polymerized monomer



**Decorators
on Glass
and Plastic
Containers
Since 1936
4 Colors in
One Operation
—Finest Detail**

*Anigraphic
Process, Inc.*

11 BROADWAY, NEW YORK 4, N. Y. • WHITEHALL 3 5253



MODERN FRENCH OIL Presses for Molding Modern Plastics

● For accuracy, speed and economical operation that brings increased profits turn to French Oil Hydraulic Presses, the choice of leading plastic molders. Complete self-contained presses with automatic time control that is instantly adjustable. Dependable, modern French Oil presses in sizes up to 1500 tons are the choice of leading plastic molders. Consult French Oil engineers or write for catalog.

THE FRENCH OIL MILL MACHINERY CO.

(HYDRAULIC PRESS DIVISION)
NEW YORK • PHOENIX • LOS ANGELES

Immediate Delivery Practically Un-used

800 GAL. DOPP KETTLE

28-32% nickel cast iron, rounded bottom, special high jacket construction capable of withstanding 145 lbs. jacket pressure when kettle is under full vacuum,—fitted with solid nickel scraping agitator,—25 HP drive, thermocouple, recording thermometer, etc.

Also

700 sq. ft. 36" dia. x 12 ft. long horizontal condenser with nickel tubes and nickel clad head, designed to maintain 15 lbs. per sq. in. pressure, or full vacuum, complete with nickel valves, piping and other accessories.

Detailed specifications, prices, and other data furnished promptly.

Box D154

MODERN PLASTICS, INC.

122 East 42nd Street • New York 17, N. Y.



NEW L. H. COOK DRAFTING ROOM

"This Is Larry Cook's Office"

That's your introduction to the most complete plastic mold shop in New England!

It's your introduction to Cook "know-how" . . . to a whole shop full of plastic mold craftsmanship . . . to the answer to your problems in plastic mold design, development or manufacture of injection, compression or extruding molds!

Yes, Larry Cook's operating in a new, larger, more completely equipped plant these days . . . but the advice he's handing out is still the same . . . sound, practical, valuable!

LAWRENCE H. COOK, INC.

65 MASSASOIT AVENUE

EAST PROVIDENCE 14, R. I.

TEL. EA 3881



The upper die of this bench type press is electrically heated with thermostatically controlled resistance coil

Fast radio assembly

A MACHINE that cuts down on the labor and time involved in production or assembling is always in demand. Today with rising costs facing production men from every angle, there is probably more interest in such machines than ever before. It is probably for this reason that the standard hydraulic bench-type press, produced by Colonial Broach Co., Detroit, Mich., has already found good acceptance in the automotive field. This press has provided a simple answer to obtaining high output rates in the assembling of metal screens to plastic radio grilles and is being used in the plastics plant of Ford Motor Co., Detroit, Mich.

300 assemblies per hour

Three of the "junior" presses are currently turning out 300 grille assemblies per hour. Accurate control of the stroke of the press is accomplished by means of a standard adjustable stop and ease of operation is a feature of the machine.

Screen plasticized in grille

The presses are equipped with special dies. The upper die, of cast iron with some 24 projecting fingers, is electrically heated with a thermostatically controlled resistance coil. When the metal screen is laid over the plastic grille lying in the lower die, a control lever is thrown which causes the upper die to press the heated fingers into the plastic to a depth of $\frac{1}{16}$ of an inch. Since the plastic grille is plasticized at the 24 heated contact points, the screen is well embedded.

Pressure of the press is cushioned so that the plastic is protected at all times from shock and damage. Retracting the press head and removing the finished grille completes the operation.

This unusual, new demonstration model of a washing machine has a cabinet of lustrous, permanently transparent PLEXIGLAS, which permits dealers and prospective buyers to see the machine in operation. The AKKA Top-Flow Automatic Washer is built by the Appliance Corporation of America. PLEXIGLAS parts fabricated by Midland Plastics Inc., Milwaukee, Wisconsin.

Here's
how one
company
stimulated
sales...



with unusual displays of *Plexiglas*

This strong, light-weight, shatter-proof plastic is ideal for demonstration models . . . because it is easily molded or fabricated into the most intricate shapes . . . because it permits an unobstructed view of construction details and mechanical operation . . . because it offers a quick, visual means of instructing sales personnel . . . because the gem-like beauty of business-building

PLEXIGLAS attracts and holds attention.

Both PLEXIGLAS sheet and molding powder are plentiful now—crystal-clear or in a limitless range of colors.

To learn how PLEXIGLAS can stimulate sales for your products, call or write our nearest office: Philadelphia, Detroit, Los Angeles, Chicago, New York. Canadian Distributor: Hobbs Glass, Ltd., London, Ontario.

Only Rohm & Haas
Makes
Plexiglas
Acrylic Plastic Sheets
and Molding Powders

PLEXIGLAS is a trade-mark, Reg. U. S. Pat. Off.

Represented by Cia. Rohm y Haas, S. R. L., Carlos Pellegrini 331, Buenos Aires, Argentina, and agents in principal South American Cities

ROHM & HAAS COMPANY

WASHINGTON SQUARE, PHILADELPHIA 5, PA.

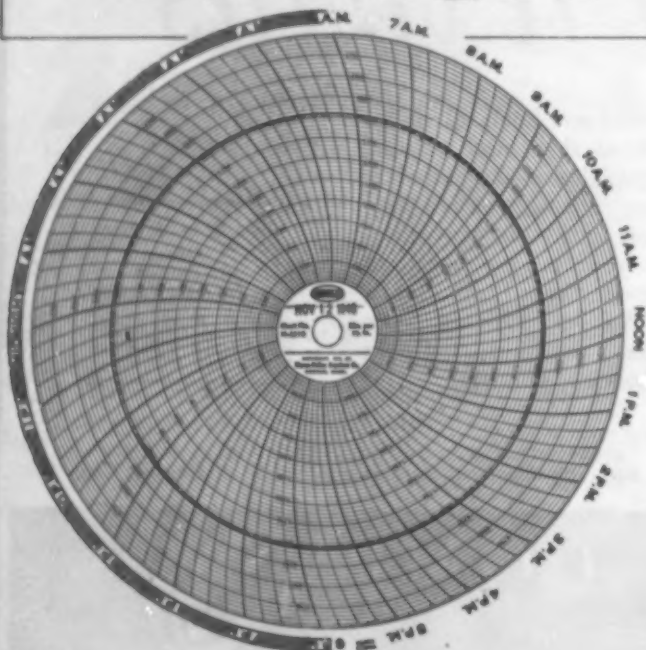
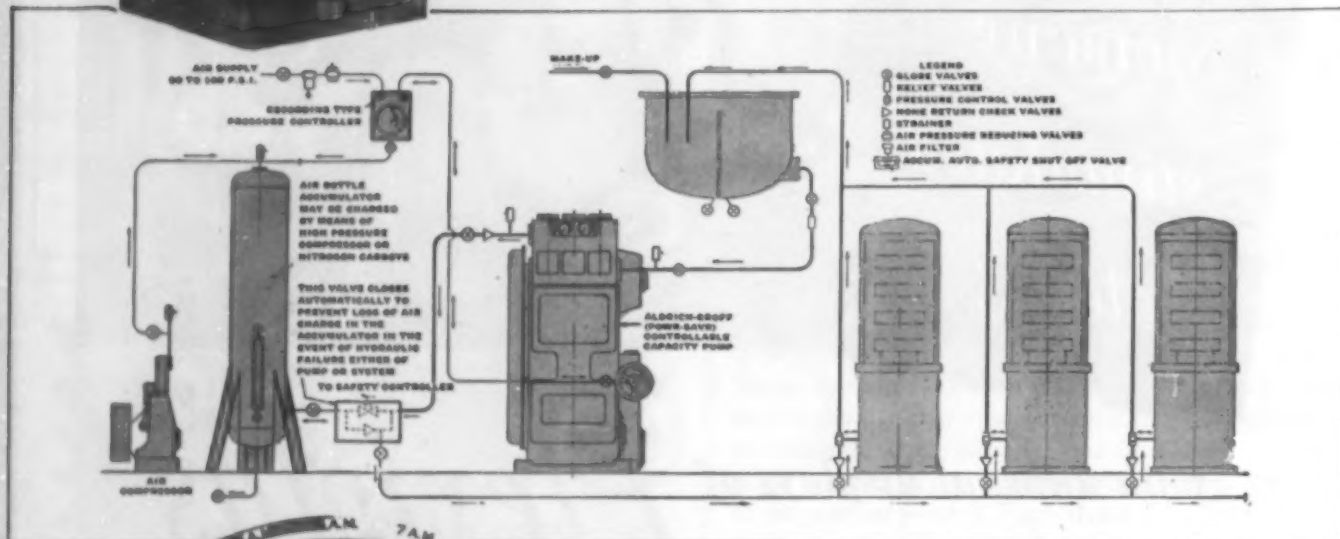
Manufacturers of Chemicals including Plastics • Synthetic Insecticides • Fungicides • Enzymes • Detergents
Germicides • Chemicals for the Leather, Textile, Ceramic, Rubber, Paper, Petroleum and other Industries



One heart for all presses



THE ALDRICH-GROFF "POWR-SAVR" CONTROLLABLE CAPACITY PUMP... a reciprocating-plunger type built in a triplex arrangement... simple, reliable mechanism controls plunger-stroke and delivery of pump from zero to rated maximum output... no change in speed of pump motor... *automatically* adjusts stroke to maintain given constant pressure... capacity *gradually* controlled to any desired continuous delivery... relatively small accumulator required... *no* variation by steps, *no* intermittent flow... gives *controlled* pump delivery, saving power... built for *all* pressures encountered in plastic molding... pressure for system can be adjusted as desired at the recording pressure controller... typical layout and flow diagram of this pump is shown below.



PRESSURE MAINTENANCE CHART... from an actual installation shows how constant the ALDRICH-GROFF "POWR-SAVR" maintains pressure in a hydraulic system. Maximum pressure variance will not exceed 2% to 5% of the desired pressure, which may be adjusted as required. Already 30 ALDRICH-GROFF "POWR-SAVR" units have been installed or are on order for the Plastics Industry.

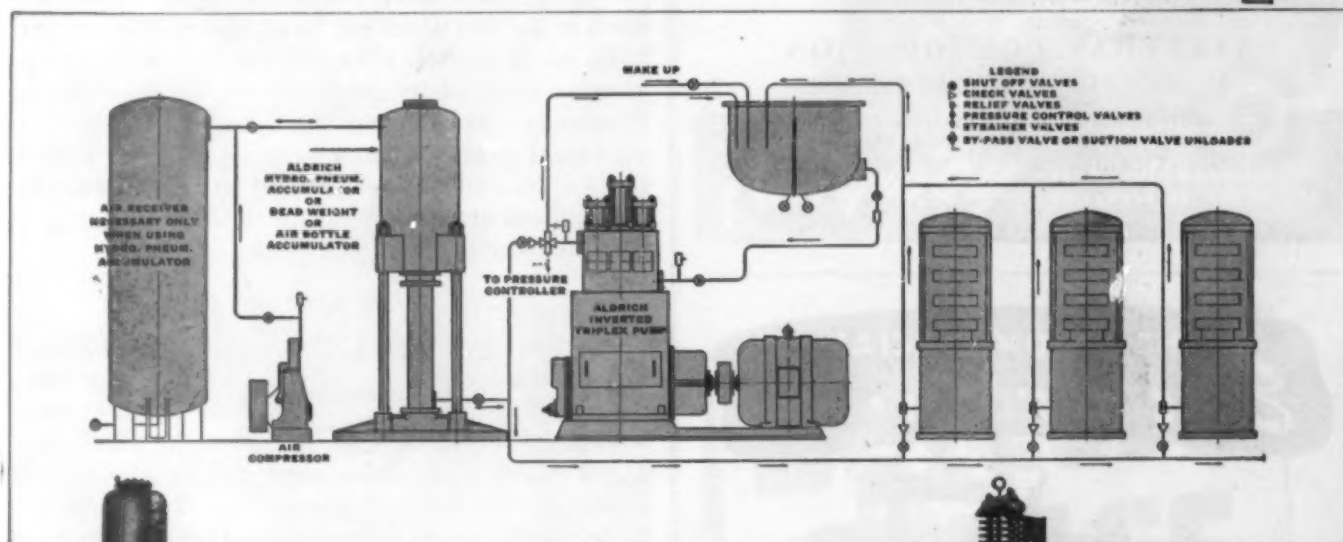


... an ALDRICH PUMP for the heart

IT'S logical and natural. Man has only *one* heart because it's the most simple and efficient pumping method nature could devise—a central supply for an entire system. Apply the same logic to your hydraulic system—use *one* heart, *one* pump, to provide fluid pressure for *all* your hydraulic presses—just as a central power station most economically serves an entire community. One ALDRICH Pump means economy, compactness, quick accessi-

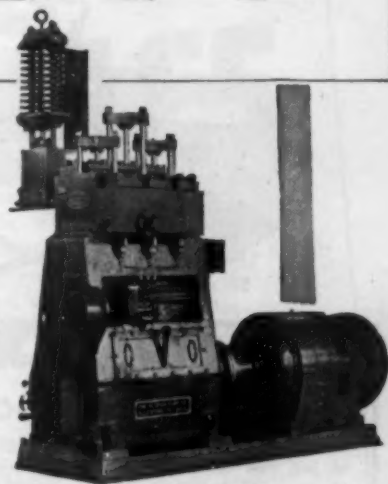
bility and easy maintenance. You lose no dollars in lost time moving from *one* unit to *another* for inspection and repair because the *heart* of your hydraulic system is centralized. Your hydraulic medium can be water, soluble oil in water as well as oil.

Various types of pumps and accumulators have been developed by ALDRICH to meet the high pressure demands of plastic molding. Bulletins describing any type will be sent upon request.



ALDRICH ACCUMULATORS... furnished in various designs such as the hydropneumatic plunger and piston type illustrated, and also dead weight or gravity types, as well as air bottles.

THE ALDRICH INVERTED VERTICAL TRIPLEX PUMP... a high pressure constant stroke, constant speed pump... drive arrangements are through gear-head motor, built-in pump gearing from extended pinion shaft, or chain, flat or V belt from extended crankshaft... can be fitted with ALDRICH Patented Synchronized Suction Valve Control for services on hydraulic accumulator systems... offers such features as accessibility of parts, totally enclosed power end, simple enclosed lubrication, low maintenance, minimum floor space, low bearing pressure and many others... can be built to order for *individual requirements*... typical layout and flow diagram of pump shown above.



THE ALDRICH PUMP CO. • 7 PINE STREET, ALLENTOWN, PA.

REPRESENTATIVES: Akron • Birmingham • Bolivar, N.Y. • Boston • Chicago • Cincinnati • Cleveland • Denver • Detroit • Duluth • Houston • Jacksonville • Los Angeles • New York • Omaha • Philadelphia • St. Louis • Pittsburgh • Portland, Ore. • San Francisco • Seattle • Tulsa

FOR PERMANENT ADHESION ON PLASTIC FILM



FUSEprint by Ververay — the quality process that was specifically engineered for plastic film — either calendered or cast. FUSEprinting assures permanent adhesion ... for the design is welded to the film itself.

If you have a visual problem, bring it to us ... our wide technical experience is at your disposal — without obligation.

VELVERAY CORPORATION

45 WHITE ST. • NEW YORK 13, N. Y.

610 SOUTH BROADWAY
SUITE 623
LOS ANGELES, CALIFORNIA

PLANTS: CLIFTON, N. J.
FALL RIVER, MASS.
REG. U.S. PAT. OFF.

THE UNION SPECIAL *Electronic* SEAMER



QUICK FACTS—

• **SEALS PLASTIC FILM.** Designed to join two or more plies of thermo-plastic film materials (Vinylite, Pliofilm, Koroseal, etc.) with neat, continuous fused seams. Can be used for hemming, binding, felling.

• **IMPROVED SPEED.** The operating speed has now been raised to a point where it compares favorably with conventional sewing machine speeds.

• **AUTOMATIC TUNING.** New automatic control of power instantly adjusts machine to variable loads such as in crossing seams.

• **A QUALITY PRODUCT.** Built by the world's largest exclusive builder of industrial sewing machines. Exclusive rotary type electrodes; low residual heat, freedom from burning. Information on request. UNION SPECIAL MACHINE CO., 413 N. Franklin St., Chicago, Ill.

Intercommunication

Two different plastics materials—phenolic and cellulose acetate—are employed in the two systems covered here

PHYSICIAN to nurse, executive to secretary, plant operator to foreman—there's hardly a large or small scale organization that cannot use one of the intra-office communication sets that cut down on the wear and tear on busy business people.

Almost everyone is familiar with the prewar sets but few have seen the newer ones utilizing streamlined plastic housings. These sturdy and attractive sets come in a variety of shapes and sizes—the smallest being compact enough to fit into a little nook. Quality of voice reproduction is one of the desirable characteristics of the sets which can be attributed in great part to the use of plastics. The plastics used also discourage vibrations caused by voice and electrical equipment. Plastics in applications of this type also have the advantage of giving the unit a permanent finish, a molded-in color that cannot be chipped off and a most desirable compactness attributable to the quality with which it can be molded in almost any shape.

A de luxe set

The Rauland Corp., 4245 N. Knox Ave., Chicago, Ill., manufacturer of communication systems for many years, includes among their equipment sets that range from simple 2-way units to the de luxe Amplicall (Fig. 1). The latter has facilities for the use of up to 24 master stations permitting as many as 12 conversations to be carried on simultaneously. It includes a hand phone which can be used when complete privacy is desired and a separate remote speaker which can answer any call from a master station without operating any control. The companion remote cabinet is to be seen in two parts at the upper left in Fig. 2. Versatile combinations of master stations and substations can be incorporated in the set to meet the specialized needs of business offices, for either communication with departments or between departments.

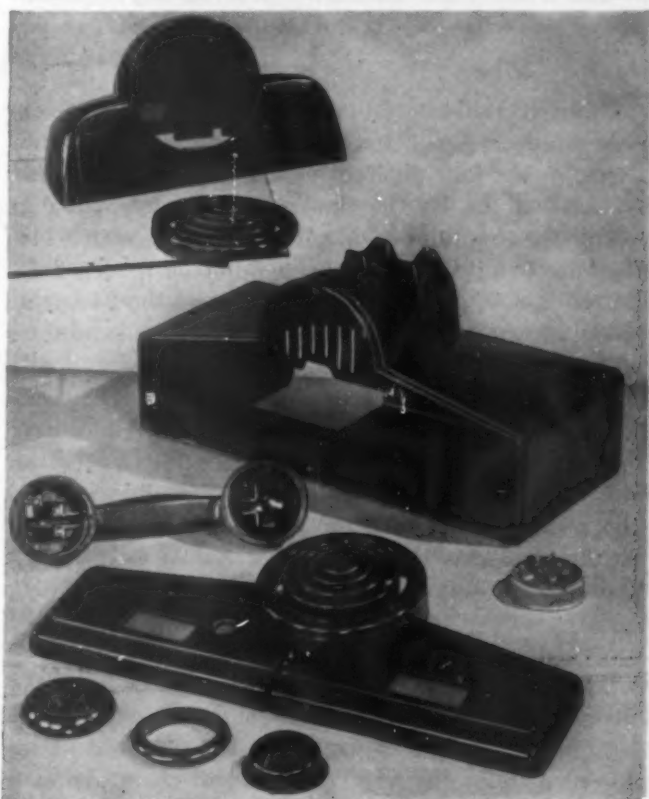
Plastic parts

All of the parts that make up the Amplicall de luxe model are molded of walnut-colored Bakelite phenolic and may be seen in Fig. 2. The master cabinet assembly has seven components—the main cabinet, the front of the cabinet, hand phone cradle, the phone and three instrument parts for the phone. The small companion remote cabinet is composed of two parts—the cabinet and the grille. All the parts are compression molded except for the grille of the small cabinet, which is transfer molded in a 2-cavity die. The other pieces

sets



1—One case, molded of walnut-colored phenolic, is used for four different models of this large master intercommunication station. Housing is so designed that additional openings for buttons are easily cut out, the number of buttons being the only difference between sets



2—Six phenolic parts go into the housing of the master set; two into the remote cabinet. Buttons on the large set are also plastic, being molded of cellulose acetate

of intercommunication set are made in 1-cavity molds.

No real finishing work is required on any of these molded parts—flash removal being all that is required. As for assembly of the component parts, on the small remote cabinet, this consists of cementing the grille to the cabinet. In the case of the large model, the front is assembled by means of machine screws. Large bolts inserted in holes drilled in cabinet are used to assemble mechanism in remote cabinet. (Continued on next page)

Plastic Markings in gold, silver or colors

THE KINGSLEY hot stamping machine is precision-built to produce clean-cut stampings of designs, names and trademarks on soft plastics and other similar materials.

Production speeds up to 800 per hour using unskilled operators.

Send samples and details of your stamping problems.



Kingsley

EASY TO OPERATE

STAMPING MACHINE CO.
HOLLYWOOD 28, CALIFORNIA

DETECTO SCALES

There's a precision-accurate Detecto-Scale for your specific weighing and counting need. The Detecto helps increase production, yet assures you maximum accuracy by making slightest weight discrepancies immediately visible.

DETECTO ALUMINUM SPEED SCALE

For increased production at lower cost! One operator with one Speed Scale does as much as two operators with ordinary scales. Sturdy, precision built, super-accurate. Ends overweight losses.

Write for circular.



DETECTO • SCALES • INC.

MAKERS OF FINE SCALES SINCE 1900

1308 MAIN STREET • BROOKLYN 1, N. Y.

SCALE ENGINEERS IN ALL PRINCIPAL CITIES

Decorators and Printers



Creative — means the finest decoration on your glass, plastic or metal container —

Creative — means unlimited production facilities —

Creative — means an expert technical staff to solve your printing problem.

Creative **PRINTMAKERS, INC.**
200 VARICK STREET, NEW YORK 14, N.Y.
WALKER 5-6300
Surface Decorators for the Packaging Field
IN CANADA: 2424 YONGE STREET, TORONTO, ONTARIO

LOOKING FOR STABLE

*Plastic
Colors?*

Then you'll want to investigate Ferro's inorganic colors—ideally suited for compression and injection molded plastics. Select from full color range. Colors stable (to 2300 degrees Fahrenheit) and highly chemical-resistant. Write for further details and samples.

Color Division

FERRO ENAMEL CORPORATION

4150 East 56 Street  Cleveland 5, Ohio



3—This is one of the cabinets in a new two-way communication set. Housing is molded of cellulose acetate

Of production interest is the way in which the molder—Richardson Co., Melrose Park, Ill.—makes allowances for the four different models of the large master station put out by the Rauland Corp. All are alike except for the number of selector buttons with which they are equipped. There is a 6-button model, a 12-button model, an 18-button model, and the 24-button model shown in Fig. 1. The same housing is used for all four. This standard frontis-piece is produced with molded-in openings for 6 selector buttons. If the front is put on the 12, 18 or 24-button sets, the additional openings are routed out of the phenolic. To facilitate this work the housing is molded with guide lines showing the position for additional openings. The die is so constructed that the plastic material is molded to a thinner section at these possible holes.

Plastic withstands heat

There were a number of reasons for choosing Bakelite phenolic for the housings of the Rauland Corp. sets. Chief among these, according to the designer, Joseph Palma, Jr., was the ability of the material to withstand heat. Since each set is equipped with an electronic amplifier, precaution had to be taken against the heat generated from this part. It was imperative that the heat not be instrumental in causing warpage and cracking. Nor could the heat be allowed to become a safety hazard. Bakelite phenolic was found amply strong to withstand the heat and at the same time act as an insulation for electronic and electrical parts. Then there was the ease with which the phenolic material could be molded to the streamlined contours of the set, the permanent finish achieved by the plastic and the material's resistance to hard wear.

Unlike the main housing, the selector buttons of these sets are molded of amber-colored cellulose acetate, a color which provides a pleasing contrast to the walnut



4—This cellulose acetate housing is molded in but one part in a 1-cavity mold. The piece is produced in black

color of the case. These buttons are molded by Chicago Die Mold Corp., 4001 Wrightwood Ave., Chicago 39, Ill.

Some of the dividend features included by the manufacturer of these communication sets are: a visual "busy" signal; plug-in installation that reduces wiring; miniature tubes; illuminated volume controls; and a special circuit that eliminates possible crosstalk caused by amplifier pick-up.

A two-way system

A handy little communication system that operates between two stations only is injection molded for the Radio Corp. of America, RCA Div., Camden, N. J. by Cruver Mfg. Co., Jackson Blvd., Chicago 12, Ill. It is so small that it takes up little more space than a desk ink stand (Fig. 3). Its petiteness allows it to be transported without effort or trouble to any place that it may be needed. Installation consists merely of plugging a cord into any 110-volt outlet, AC or DC. Simple operation—it has only one lever—encourages its use for the briefest of conversations.

This Tom-Thumb edition for 2-way communication is molded in one piece of either Lumarith or Tenite I. These materials have been proved to have good resonant qualities and at the same time give the necessary strength to the housing.

The housing (Fig. 4) is available in black only and is injection molded in a 1-cavity die that produces the completed part in one shot. Assembling of the electrical mechanism to the plastic housing is simply achieved by metal screws.

The RCA communication set has a separate amplifier that can be placed in any spot—near or far away—and once it is adjusted to the desired intensity of sound, it need not be handled again but can be left entirely alone.

PHENOPREG MATERIALS for MOLDING and LAMINATING

High Pressure—Low Pressure

★ The various grades of PHENOPREG materials are resin impregnated papers, fabrics and fiberglass which can be molded by the application of heat and pressure. They are an interesting group of materials which offer untold possibilities in the plastics field for the production of molded laminates, structural assemblies, laminates, reinforcements for molding compounds, core stocks, and many other applications.

We offer the following PHENOPREG grades for your consideration—

PHENOPREG—Phenolic resin impregnated papers, cotton sheetings, and ducks and fiberglass grades.

PHENOPREG MB—Melamine resin impregnated plain, colored and printed decorative papers for the production of decorative laminates, graphic panels, translucent decorative laminates, place mats, etc.

The Plastics Division of Fabricon Products was the first organization to produce and announce melamine treated papers suitable for low pressure lamination.

PHENOPREG X-CREPE—phenolic resin treated X-creped paper having all-directional stretch for compound curve and contour molding.

We invite your inquiries for standard and special grades of PHENOPREG materials.

★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★

FABRICON PRODUCTS, INC.

PLASTICS DIVISION

1721 Pleasant Avenue

• River Rouge 18, Michigan
Vinewood 1-8200

Complete Line of Machinery for Celluloid and Plastics Mfrs. JOHN J. CAVAGNARO

HARRISON Engineers and Machinists NEW JERSEY
ESTABLISHED 1881

Presses for
Dehydrating
Filtering, Cak-
ing, Polishing,
Stuffing, etc.



Mixers: Plain or Stainless
Preliminary or Vacuum

We'll dye for you!

Gypsy

PLASTIC DYES

REDUCE YOUR INVENTORY

Carry one stock color We'll dye for you!

STOP PRODUCTION LOSSES

Use off-shade runs We'll analyze your needs!

SIMPLIFY PROCUREMENT

Stock always available. We'll process your products!

ADD SALEABILITY TO YOUR PRODUCTS—12 Standard jewel-like colors or combinations make the color range unlimited. Colors are infused without altering original finish or lustre. Or, if you prefer to do your own dyeing, Gypsy Cold, Dip Dyes are available with complete, simple instructions.

New! Gypsy Plastic Cement—Non-inflammable, non-explosive. Twelve standard colors, combinations and clear. Moderate setting speed permits "working" with materials to be welded.

Free Trial!

We'll prove Gypsy Plastic Dyeing is beautiful and practical. Send sample of plastic material and the color desired. We'll dye it and include a sample of Gypsy Plastic Cement to match. No obligation.

GYPSY DYES, INC. Division of Wittle Mfg. & Sales Co.,
1414 S. Wabash Ave. • Chicago 5, Ill.

Dealers in
PLASTICS
SCRAP

MEYER & BROWN CORP.

Founded 1894

347 Madison Ave., New York 17, N. Y.



PHOTO, COURTESY AMERICAN CAN CO.

1—Use of plastic on side seam gives more attractive can as can easily be seen by comparison with solder seam at left

Thermoplastics in tin cans

THE tin can which might be thought of as having a staid and unchangeable design has recently been given two improvements by the American Can Co., 230 Park Ave., New York City.

The first improvement relates to eye-appeal—accomplished by using a thermoplastic seal for the side seam of the can in place of solder. Containers sealed up the side with the plastic composition may be fully decorated around the outer wall of the can by lithography. Unlike soldered cans, having a 1/8-in. wide strip of solder which cannot be overprinted, the plastic seam is applied invisibly on the inside of the seam (Fig. 1).

The seam bonder is actually a synthetic rubber with a thermoplastic resin and the necessary plasticizer added to give proper adhesion qualities. It is water-white, taste-free and has extreme impermeability to moisture. Although tough, the material is not recommended on vacuum-pack cans.

Moisture-proof can

The second improvement to be made on the tin can incorporates a new type of closure which can be resealed after the can has been opened. The moisture-proof resistant seal is achieved by an interrupted thread type cover, having a ring gasket located inside the indented outer edge of the cover, where it fits over the top of the can body. This gasket, which also helps to lock the cover tightly in place, is made of a paper impregnated with a wax and a thermoplastic resin. As the cover is pressed on the can, it contacts the interrupted threads that are incorporated in a double seamed ring extending

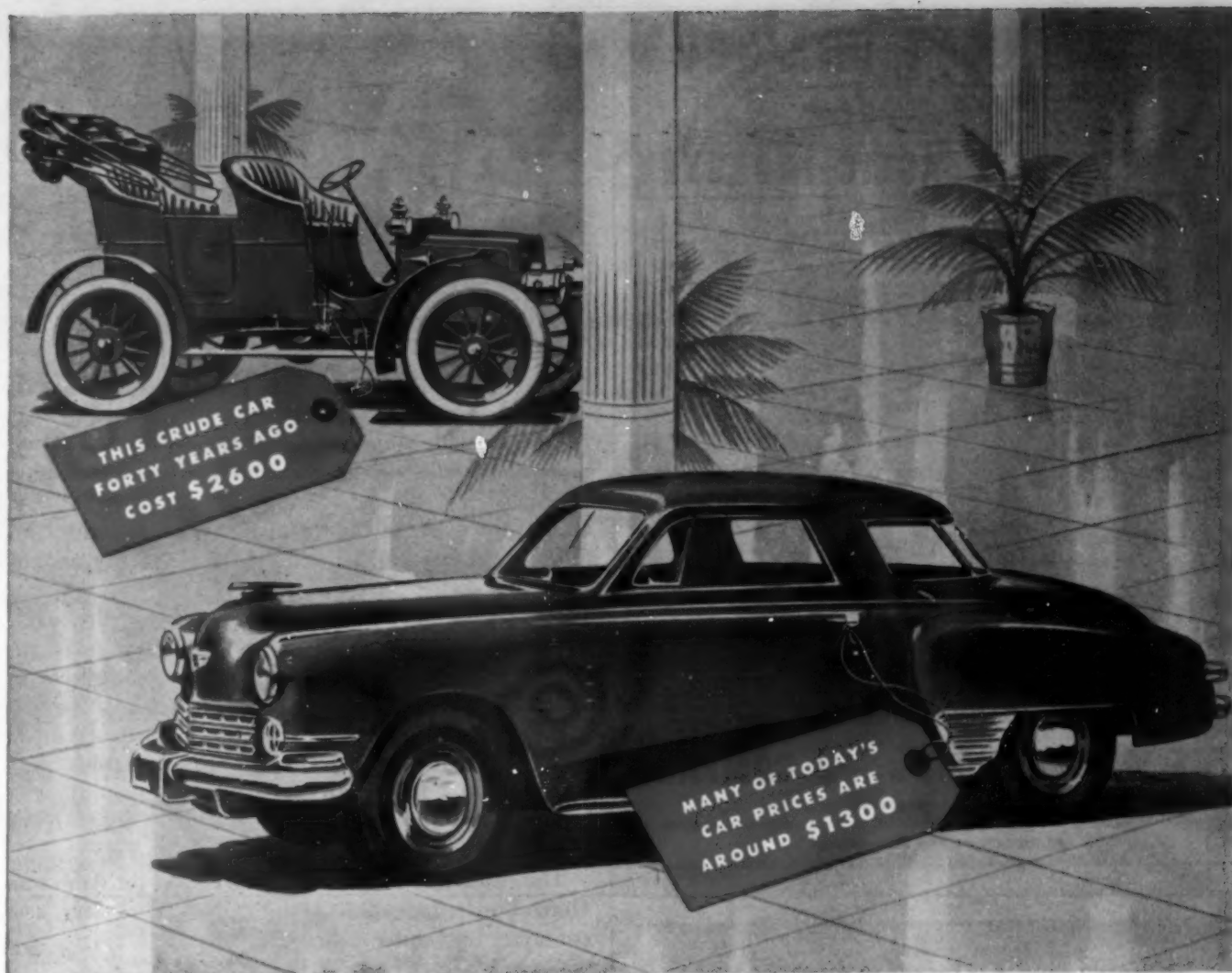


Figure it out...Work Pays!

Four Cars "for the Price of One"

In terms of automobiles, see how work pays! Production 40 years ago was less than 50,000 cars annually. Prices then were more than twice the cost of cars after production had climbed into millions per year. *Values* today are many times greater. *Purchasing power* of the average wage-earner has more than *doubled*. Conservatively stated, this means that the public gets the equivalent of about *four* fine motor cars today for less than the relative investment in *one* in 1906!

Many other examples of how work pays could be cited. Only through increased production... not slow-downs or idleness... can real income-increases be attained. Distortions of that truth may persist, but the fact remains. And the public must be reminded, repeatedly, that only through increased production can the masses benefit by technological advances of recent years in industry.

To help manufacturers improve their production and their products, MOSINEE paper technicians are ready to work. Call us!



MOSINEE

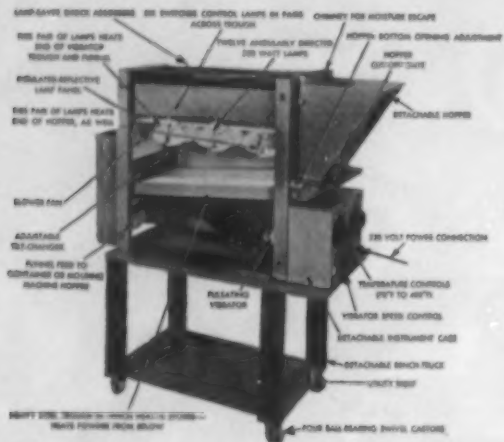
**PAPER
MILLS
COMPANY**

MOSINEE • WISCONSIN

Essential Paper Makers

*Please address
your letter
Attention
Dept. 4*

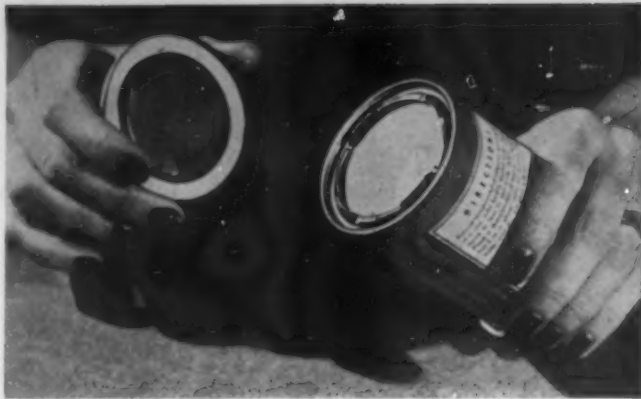
SERVES THE PLASTIC INDUSTRY



For seven years the plastic industry standard for automatically drying and preheating plastic powder granule by granule.

THE MISKELLA *infra-red* COMPANY

DESIGNERS — MANUFACTURERS OF
INFRA-RED OVENS • APPLIANCES • SECTIONAL UNITS • MACHINES AND CONVEYORS
Main Offices and Laboratory
East 73rd and Grand Ave., Cleveland 4, Ohio



2—The specially impregnated gasket on inside edge of cover makes this new metal container easily resealable

around the inside of the top of the can. A slight turn of the cover engages the can and cover threads, accomplishing a seal.

Just inside, and a fraction of an inch below the cover, is an airtight drumhead seal. Its installation is accomplished by heat-sealing the thermoplastic-coated disk to the underside of the ring prior to the seaming of the ring into its position at the top of the can. The disk is made of paper, treated with a thermoplastic moisture resistant coating. Its primary purpose is to make the can tamper-proof and the seal must be broken with a blunt instrument to get at the contents of the can (Fig. 2).

The reseal can was specially developed for American Home Foods, Inc., 22 E. 40th St., New York City, as a container for soluble coffee.

Plastics Products Addresses (pages 115 to 118)

Acme-Lite Products Co., 350 E. 132 St., New York City.
American Molding Co., 355 Fremont St., San Francisco 5, Calif.
AMI, Inc., 679 N. Wells St., Chicago 10, Ill.
Anchor Plastics Co., Inc., 533-541 Canal St., New York City.
Barnes & Reinecke, Inc., 230 E. Ohio, Chicago 11, Ill.
Bernard Stamp Engineering Co., 3120 Monroe St., Toledo, Ohio.
R. H. Bishop Co., Champaign, Ill.
Boonton Molding Co., 326 Myrtle Ave., Boonton, N. J.
Champion Molded Plastics, Toledo 8, Ohio.
Chicago Die Mold Corp., 4001 Wrightwood Ave., Chicago, Ill.
Cleveland Twist Drill Co., 1242 E. 49th St., Cleveland 14, Ohio.
Cowen-Boyd Co., Chartley, Mass.
Cruver Mfg. Co., 2460 Jackson Blvd., Chicago 12, Ill.
Eversharp, Inc., 1800 W. Roscoe St., Chicago, Ill.
Glen Dimension Co., 2631 S. 31st St., Milwaukee 7, Wis.
Injection Molding Co., 3827 Independence Ave., Kansas City 1, Mo.
Jessall Plastics, Inc., Hartford, Conn.
Kluse Mfg. Co., Grand Rapids, Mich.
Measuring Device Corp., 890 Broadway, New York City.
Modern Living, Inc., 324 E. Third St., Cincinnati 2, Ohio.
Norco Plastics Co., 3204 W. Vliet St., Milwaukee, Wis.
Plastic Molding Corp., 859 Hathaway St., Cincinnati, Ohio.
Printloid, Inc., 93 Mercer St., New York City.
Prisk Plastic Molding, 2112 Chestnut St., Alhambra, Calif.
Pyroxilin Products, Inc., 4853 S. St. Louis Ave., Chicago, Ill.
Roma Wine Co., Fresno, Calif.
Sellon-Collins Industrial Designers, 808 N. Third St., Milwaukee, Wis.
W. A. Shaeffer Pen Co., Fort Madison, Iowa.
Standard Molding Corp., Box 1020, 1517 E. Third St., Dayton 1, Ohio.
Stanley Sapery, 11 E. 44th St., New York City.
Synthane Corp., Oaks, Pa.

Stock Mold Addresses (mentioned on page 160)

1764-67 Eclipse Molded Products Co., 5150 N. 32nd St., Milwaukee 9, Wis.

Answer

**to many
molding
problems**



NEWARK DIE COMPANY, Inc.
20-24 SCOTT ST. NEWARK, N. J.

Telephone: Market 2-3772, 2-3773

SET 'EM UP AGAIN AND AGAIN, AND AGAIN!



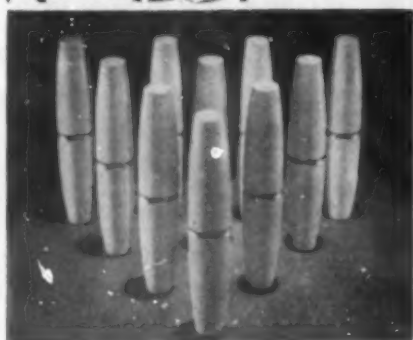
Not hundreds of times, but thousands of times. Standard maple wood pins, all dressed up in tough plastic (Celcon), keep their good looks and uniformity, last longer and never have to be trimmed.

Molded by NORTHERN for the Durable Bowling Pin Corp. of Brookline, Mass., Gold Stripe Pins are in use in many large bowling centers, cutting operating costs and increasing enjoyment of the sport.

Things like this, "never done before", are a specialty with NORTHERN.

Over 38 years' experience with plastics of all kinds has equipped our designing, engineering and molding personnel with the knowledge of what molding compounds to use, how and when to use them, and the best way to mold each one.

Why not find out what NORTHERN can do to improve the appearance or performance of your product through the use of plastics?



Northern INDUSTRIAL CHEMICAL CO.

38 Years of Plastic Molding Experience

7-11 ELKINS ST.

SO. BOSTON, MASS.

SOU. BOS. 4240

BRANCH OFFICES

441 Lexington Ave., New York, N. Y.
Tel. Vanderbilt 6-1684

P. O. Box 476, Rochester 2, N. Y.
Tel. Charlotte 3270

P. O. Box 5604, Phila. 29, Pa.
Tel. Victor 8679



LABORATORY Mills & Presses



The EEMCO Laboratory Mill is entirely enclosed, ready to operate. It is equipped with built-in motor, control and variable speed drive. Mechanism readily accessible.

The 12" x 12" EEMCO 42-ton Laboratory Press is furnished with self-contained hand pumping unit, air operated fast closing, steam or electric platens, adjustable opening from 6" to 18".

Both Mill and Press are designed for research, development and small scale production.

Bulletins and additional detailed description on any EEMCO products will be sent on application . . . Early deliveries now.

Sales Representatives

OHIO
DUGAN & CAMPBELL
907 Akron Savings & Loan Bldg.
AKRON, OHIO.

EASTERN
H. E. STONE SUPPLY CO.
OAKLYN, N. J.

MIDWEST
HERRON & MEYER OF CHICAGO
38 South Dearborn Street
CHICAGO 3, ILL.

MILLS • PRESSES • EXTRUDERS
TUBERS • STRAINERS • WASHERS
CRACKERS • CALENDERS • REFINERS

EEMCO — ERIE ENGINE & MFG. Co.

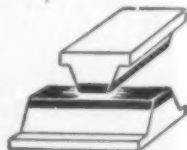
953 EAST 12th ST., ERIE, PENNA.

A BILLION ORDERS A DAY

In a large modern telephone office 2,000,000 switch contacts await the orders of your dial to clear a path for your voice. They open and close a billion times a day.

At first, contacts were of platinum—highly resistant to heat and corrosion but costly. Years ago, Bell Laboratories scientists began looking elsewhere, explored the contact properties of other precious metals—gold, silver, palladium and their alloys—and with the Western Electric Company, manufacturing unit of the Bell System, restudied shape, size and method of attachment.

Outcome of this long research is a bar-shaped contact welded to the switch and positioned at right angles to its mate. For most applications, an inexpensive base is capped with precious metal.



Savings from these contacts help keep down the cost of telephone service. This is but one example of how Bell Laboratories serve the public through your Bell Telephone Company.

An engineer examines contacts in a crossbar office. Horizontal bars seen in the crossbar switches select contacts which are then operated by vertical bars to establish talking paths between subscribers.

BELL TELEPHONE LABORATORIES



EXPLORING AND INVENTING, DEVISING AND PERFECTING, FOR CONTINUED IMPROVEMENTS AND ECONOMIES IN TELEPHONE SERVICE

AN IMPORTANT ANNOUNCEMENT

TO INTRODUCE

Lustrex

MONSANTO'S NEW HEAT-RESISTANT POLYSTYRENE

Ready now for applications formerly outside of polystyrene's practical limits is Monsanto's Lustrex. A radically improved product, this new polystyrene adds high heat resistance, quick setting characteristics, and increased strength to the already outstanding qualities of popular Lustron.

Consider all these advantages which Lustrex has over ordinary polystyrene . . . see if they don't offer you new opportunities in today's competitive markets:

- 1 HIGH HEAT RESISTANCE**—Lustrex has an ASTM distortion point 10-30 degrees Fahrenheit higher than ordinary styrene molding compounds. Molded articles which will withstand scalding water for periods of ten to fifteen minutes without visible distortion have been produced from Lustrex.
- 2 FASTER MOLDING CYCLES**—In some cases, molding cycles have been speeded as much as 30% without affecting appearance of the finished product.
- 3 GREATER FLEXURAL STRENGTH**—Flexural strength of Lustrex has been increased to 12 to 14 thousand pounds per square inch.
- 4 INCREASED RESISTANCE TO IMPACT**—Assures less breakage in finished molded articles.
- 5 NO SPECIAL EQUIPMENT OR ALTERATIONS NECESSARY.**
- 6 CHEMICALLY INACTIVE**—Unaffected by acids such as sulfuric, hydrochloric, hydrofluoric.
- 7 AVAILABLE IN A WIDE VARIETY OF FAST COLORS.**
- 8 APPEARANCE UNIMPAIRED.**
- 9 DIMENSIONAL STABILITY EVEN UNDER STRINGENT CONDITIONS.**
- 10 LOW WATER ABSORPTION.**

It will pay you to learn more about remarkable Lustrex. Get full technical data from: MONSANTO CHEMICAL COMPANY, Plastics Division, Springfield 2, Mass. Lustrex: Reg. U. S. Pat. Off.

IMPORTANT PHYSICAL QUALITIES OF LUSTREX

PROPERTY	LUSTREX
Molding quality	Excellent
Injection Mold. Temp. °F.	350-550
Injection Mold. Pressure, psi	10,000 and up
Specific Gravity	1.05
Flexural Strength, psi	12,000-14,000
Flexural Deflection, inches	0.15-0.25
Impact Strength, ft. lbs. per inch, (unnotched)	3.2-3.6
Heat Distortion Temp., °C. (air bath)	87-88
Dielectric Constant, 1 megacycle	2.5-2.7
Power Factor, 1 megacycle	0.0001-0.0005
Water Absorption, % (24 hrs.)	0.04-0.05

MONSANTO
CHEMICALS — PLASTICS

S E R V I N G I N D U S T R Y . . . W H I C H S E R V E S M A N K I N D

AQUA PLASTIC DYE

Patent Pending

Here is a Permanent dye in Water solution! Developed especially for your clear plastics. *AQUA PLASTIC DYE* has these outstanding features:

- (a) Ease of application—30 to 60 seconds immersion in 200° F water to which dye has been added
- (b) color deposits evenly
- (c) plastic retains polished luster
- (d) fire hazard eliminated
- (e) no unpleasant or toxic odors.

GREAT AMERICAN COLOR CO.

2512 West Ninth Street,
Los Angeles 6, California

New York Rep: Plastics Dye &
Supply Co., Ocean Gate, New
Jersey. Chicago Rep: Acme Plastics
Supply Co., 939 No. Wells St.,
Chicago 10, Illinois

Also manufacturing a
complete line of cold dip dyes.



AQUA PLASTIC DYES in 15 basic colors for any of 150 lovely pastel or brilliant shades in a matter of seconds. Highly recommended for methacrylates, nitrates, acetates, acetobutyrate, ethylcellulose and vinyl chloride.

Other **GREAT AMERICAN** products include "GAMCO", a "non-burning" buffing compound for plastics; **ANNEALING COMPOUND** which creates a bond stronger than the plastic itself; **LAMINATING COLORS**, a cement with color—no air bubbles, no streaks.

SPEED PRODUCTION • LOWER DYEING COSTS

FILLERS

WOOD FLOUR

COTTON FLOCK

and FABRICS

OF SUPERIOR QUALITY

FOR THE

PLASTIC INDUSTRY

LARGEST DOMESTIC SUPPLIERS

BECKER, MOORE & Co., INC.

NORTH TONAWANDA, N. Y.



Acrylic applicator is used in treating angioma of the eyelid. Scars left by this method are smooth, pliable

Acrylic applicator

MANY SKIN lesions, including benign and malignant growths, require the use of dry ice (solid carbon dioxide) for effective treatment, but hitherto physicians have had great difficulty in applying such a cold and brittle substance to the skin.

A new apparatus, developed by Kidde Mfg. Co. of Bloomfield, N. J., employs transparent Plexiglas in the applicator and insures complete insulation of the dry ice from both the operator's fingers and adjacent tissues of the patient. At the same time, it allows the operator to see how much dry ice remains in the applicator. With finger-tip pressure on the plunger, he can regulate precisely the quantity of dry ice at the tip.

Falling chips a hazard

With older methods of cutting pencils of dry ice from solid sticks, chips would fall off the pencil and on to normal tissues, causing considerable injury. If packed in metal applicators, the cold was transmitted to the operator's hand and to surrounding tissues, causing discomfort and harm.

Molded by the General Electric Co. at Taunton, Mass., the applicator posed a problem in that it required a material having resistance to the extreme cold (−60° F.) of dry ice, together with high insulation, light weight, strength and durability. Acrylic not only has these properties but, in addition, is transparent and capable of being formed to exact dimensions. Further, it has a sanitary appearance.

Applicators, expansion chamber, cartridges

The new acrylic applicator is part of a kit, which includes a set of 24 cartridges containing carbon dioxide



Molded acrylic applicators in the dry ice kit come in a variety of sizes to accommodate the needs of the doctor

in gaseous form and an expansion chamber, into which the gas is poured, causing it to cool so rapidly that it turns to snow. When the snow is transferred to the acrylic applicator, a central pestle in this crayon-like part is used to form the snow into a compact snow, or ice. The bevel at the bottom of the applicator not only insures easy application to the skin but also prevents the compacted snow from being forced out.

The dry ice kit assembled by the Kidde Mfg. Co. contains several applicators of varying sizes, an expansion chamber and the gas bomb cartridges. All are placed in a compartmented carryall, 6½ in. sq., that is conveniently carried by a physician.

Variety of uses

Cryotherapy—as the use of dry ice is known in medical circles—has many applications. It can be used in the cure of acne, eczema, verrucae, epitheliomas, keloids, lupus erythematosus, keratoses, angiomas, lymph-angiomas, soft corns, pigmented nevi, psoriasis patches, rosacea and xanthomas.

Although introduced back in 1905, cryotherapy never achieved the popularity it deserved, largely because of the difficulties in handling which the new kit overcomes. These difficulties include making and applying the ice, tedious labor, lack of uniformity in chip size, high cost, lack of portability and the necessity for quite cumbersome equipment.

Smooth and pliable scars

Because the scarring which remains after cryotherapy is smooth, pliable and cosmetically satisfactory, this treatment is more safely used around the eye than are other methods. Application of dry ice requires extreme care—so much so that the physician generally times the procedure with a second hand, and must carefully regulate his own hand pressure on the crayon plunger.



in all commercial plastics

...IS OUR BUSINESS!

There's no application too imaginative, no technical problem too tough for our molding service to handle—and come up with successful moldings. We work in thermoplastics, thermosetting plastics and cold-molded materials, by injection, transfer & compression methods. We advise you from more than two decades of successful experience in design and production.

PLASTIC MOLDING

CORPORATION
SANDY HOOK, CONN.

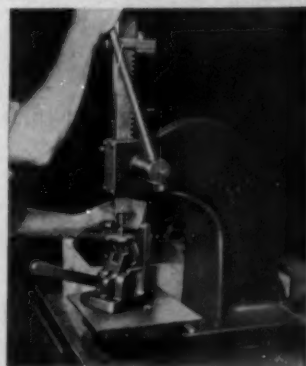
"1.4c A YEAR FOR MAINTENANCE"

famco

ARBOR PRESSES

A POWERFUL MACHINE THAT NEEDS NO POWER

A manufacturer of automobile accessories and household appliances (name on request) has purchased 1,659 Famco Arbor Presses in the past decade for assembly operations. The cost to maintain these constantly busy machines averaged 14c per press over the 10-year period. These presses, in sizes to 15 tons pressure, require a small investment, speed up work, are easily portable, and save power and floor space. Write today for full details.



FAMCO MACHINE CO. • 1305 18TH ST. • RACINE, WIS.

famco COST CUTTING **machines**

ARBOR PRESSES • FOOT PRESSES • SQUARING SHEARS

AUGUST • 1947

195

**Do YOU have a
PRESSING
PROBLEM?**



A little ingenuity and a Hein-Werner Hydraulic Jack can provide the answer to many pressing problems in laboratories and plants manufacturing plastic products. We supply the unit and you incorporate its use in a press of your own construction.



Whatever your pressing requirements, the powerful, easy-operating efficiency of Hein-Werner Hydraulic Jacks can provide the capacity to handle the job. Made in Models of 1½, 3, 5, 8, 12, 20, 30, 50 and 100 tons capacity. See your nearest industrial supply distributor, or write us for details.

HEIN-WERNER CORPORATION
WAUKESHA • WISCONSIN

PLASTIC MOLDS

We make superior, modern plastic molds that produce clean, uniform plastic parts.

- INJECTION
- COMPRESSION
- TRANSFER

Also — Hubs, dies, pantograph engraving, glass stone dies, glass stone molds.

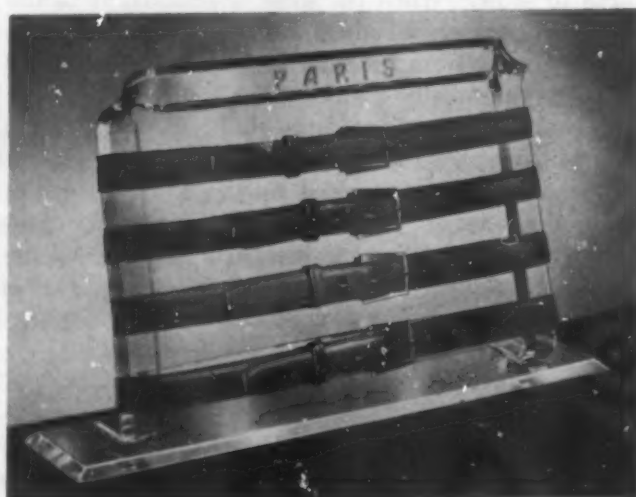
Inquiries will receive prompt attention.

M **AURICE A. GAGNON**
COMPANY
512 York Avenue Pawtucket, R. I. Tel.: Perry 2813

Five transparent

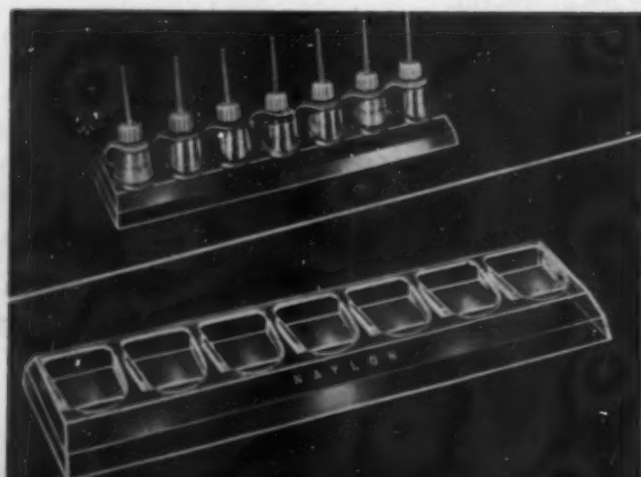


Above—Car in this Ford display is incased in two half spheres of Plexiglas blown by Cadillac Plastic Co. Base is formed with hollow bottom. Top is cut to hold globe

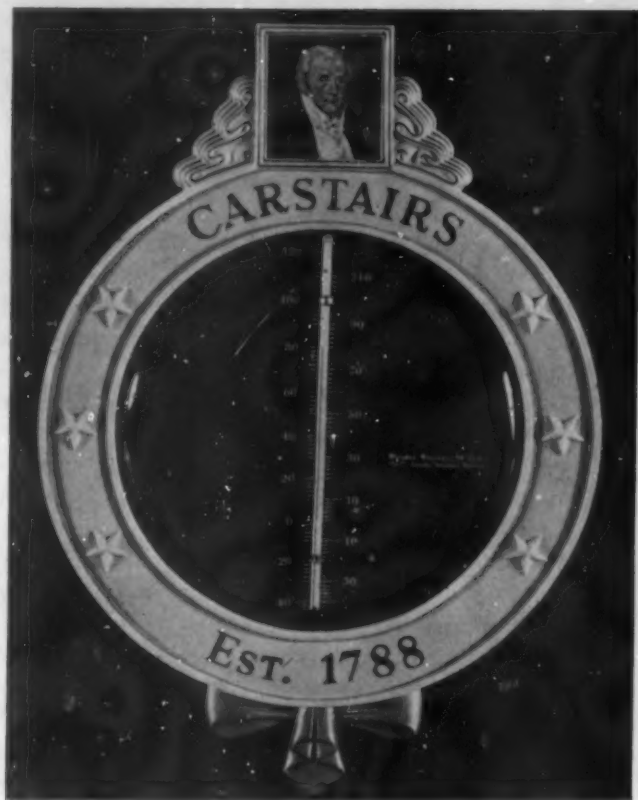


Above—Plexiglas display, having light catching bevel, is fabricated by Emerson Plastics Corp. for A. Stein & Co.

Below—Seven Nylon bottles fit on this sparkling tray injection molded of clear Loalin by Sterling Plastics Co.



displays



Above—Opaque and clear acetate are used in Carstairs Distillers Corp. thermometer display designed by Michael Saphier Associates and fabricated by Design Center

Below—These pipes of C. B. Weber & Co. remain dust free in a case which is fabricated from sheets of Lumarith



Special types have been developed for each plastic

Pearl Essence



THE
MEARL
CORPORATION

153 Waverly Place New York, N.Y.

F	O	L	L	O	W	-	U	P
P	A	Y	S		O	F	F	
A	T							

AMERICAN PLASTICS ENGINEERING

From the time you present us with an idea right up to the molding and finishing, our staff of skilled plastics molding technicians follow-up with all the steps designed to eliminate production difficulties.

Here are the steps that pay off in success for the finished product:

Designing — Styling — Model Making — Mold Building
Facilities Layout — Operations Controls — Heatronics
Molding and Finishing Problems

Call or write without obligation



AMERICAN PLASTICS ENGINEERING CORP.
3020 East Grand Blvd. Detroit 2, Michigan

AUGUST • 1947 197

S.S. White THERMOPLASTIC SCREWS



S.S. White offers a new line of small Thermoplastic Screws.

Light Weight
Electrical Resistance
Appearance

These screws offer new features for many assembly applications.

Illustration shows #6-32 x 1/2" oval head screws.

Submit your requirements.

• • •

CONTRACT MOLDING
 in all standard thermoplastic
 and thermosetting materials

Actual Size

S.S. WHITE
THE S. S. WHITE DENTAL MFG. CO.

PLASTICS
Dept. M, 10E, 40th St., New York 16, N.Y.

DIVISION

PLASTIC SHAFTS • FLEXIBLE SHAFT TOOLS • AIRCRAFT ACCESSORIES
 SMALL CUTTING AND GRINDING TOOLS • SPECIAL FORMULA ADHESIVES
 POLISHED SURFACES • PLASTIC SPECIALTIES • CONTRACT PLASTIC MOLDING

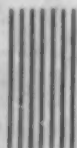
Early Deliveries of



PRECISION-TOOLED MOLDS for COMPRESSION, INJECTION and TRANSFER MOLDING

You get quick delivery of finished molds from LENCO because our machine shop facilities are geared to a carefully devised work schedule. Moreover, design modifications recommended by our experienced engineering staff may result in simplified, lower-cost mold construction as well as improved molding performance.

If early mold delivery or design changes can benefit your new product, address your communication to



LENCO DIE & MOLD CO.
 25812 JOHN R. STREET
 ROYAL OAK, MICHIGAN

Embossing acrylic

SIMPLICITY of technique is, perhaps, the outstanding characteristic of a new technique of embossing acrylic and other thermoplastics which has just been announced by the Furane Plastics & Chemicals Co. of 4500 Brazil St. Los Angeles 26, Calif. Not only is the equipment necessary to the successful application of this method of the simplest, but there is no need for highly skilled labor except for the making of the model.

The secret of the process lies in a newly developed casting material, called Ceramite,¹ which cures at room temperature and comes ready for use. The true simplicity of this new embossing technique is clearly evident in the following detailing of the procedure:

1. A model is prepared in modeling clay or any equivalent material with the design that is to be embossed in the thermoplastic.

2. Ceramite is poured over this model. This new casting material is allowed to set for approximately 30 min. before it is removed from the model.

3. The Ceramite casting is cured for several hours or overnight at room temperature. It is then ready for use in the actual thermoplastic embossing.

4. A warmed thermoplastic sheet, backed with a heavy rubber pad, is placed in the proper position over the casting and pressed firmly against it. This rubber pad acts to force the plastic into every detail of the design. Even the most delicately etched designs appearing on clay model can be faithfully reproduced.

¹ Product of Furane Plastics and Chemicals Co.

The three steps in a new method of embossing acrylic are shown here. At top are two different clay models; immediately below is casting; at bottom is finished acrylic embossing made by pressing acrylic sheet against casting

PHOTO, COURTESY FURANE PLASTICS & CHEMICALS CO.



ROCKFORD

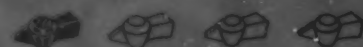
MOLDING MACHINE for THERMOSETTING MATERIALS



Lets ONE MAN Produce Work Equal
to as much as FOUR MEN



Automatic Precision
Control Of Time and
Temperature
throughout complete
cycle from powder
to finished part



MORE PARTS PER HOUR . . . Up to
400% more than by conventional
methods. Operator's job consists only
of removing finished parts from mold
. . . and refilling hopper.



LOWER DIE COSTS
. . . closed type mold
plus low molding
pressures result in
minimum die costs.
Injection molding die
easily converted for
thermosetting use.

WRITE FOR ROCKFORD
HY-JECTOR BULLETIN 147

Now You Can Mold THERMOSETTING MATERIALS as automatically as you mold thermoplastic materials

The **ROCKFORD** gives you production speed and ease in molding thermosetting materials . . . eliminates completely the slowness and multiple problems typical of conventional methods. The reason is simply that all stages of production—preforming, preheating, molding, and curing—take place automatically in continuous sequence in this single machine. Timers and controls may be set to meet the exact requirements of the particular part and plastic material. The **ROCKFORD** is now built as an 8-ounce capacity machine. If you want lower costs, high quality production, and wider practical application in thermosetting materials molding write for complete information and Bulletin 147

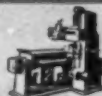
ROCKFORD MACHINE TOOL CO.
ROCKFORD ILLINOIS

4710

FOR THE METALWORKING INDUSTRY

FOR MOLDING

Hy-Draulic



PLANERS and SHAPER-PLANERS

SHAPERS

SLOTTERS

THERMOSETTING PLASTICS

AUGUST • 1947

199

Brilhart AND Quality

ARE SYNONYMOUS

If your needs are quality plastic items . . .

ARNOLD BRILHART LTD.
will be pleased to serve you.

For your tough plastics problems
in compression, injection, transfer
molding and precision machining.

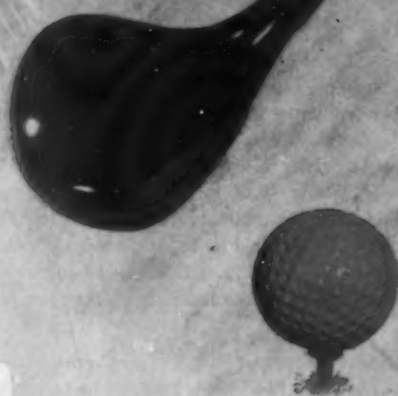
ARNOLD
 Brilhart 
LTD.

BOX 31

MINEOLA

N. Y.

*"Championship"
isn't an Accident...*



COLORS

PLASTICIZERS

RESINS

FILLERS

IN the Champion's swing are the ingredients that assure the skillful result . . . Precision and Balance are not the product of accident, but of meticulous application, skillful practice and study . . . In Plastics compounding, too, "championship" results depend upon *Precision and Balance* . . . The skillful blending of materials is aided to a great extent by their consistently precise uniformity — and quality . . . In **COLORS, PLASTICIZERS, RESINS, FILLERS** for dependable day-in, day-out production accuracy you will find *PRECISION* character in the Harwick Standard Chemical Line . . . Whatever your need may be for coloring, softening, strengthening, and extending plastics compounds — here are materials with the uniform quality that always give the right result . . . Write for full information on "Masterbatch" **STAN-TONE** Colors, Plasticizers, Resins or Fillers for plastics compounding.



HARWICK STANDARD CHEMICAL CO.

AKRON 8, OHIO

Branches: Boston . . . Trenton . . . Chicago . . . Los Angeles

Books and Booklets

Write directly to the publishers for these booklets. Unless otherwise specified, they will be mailed without charge to executives who request them on business stationery.

Low-Pressure Laminating of Plastics

by J. S. Hicks, assisted by R. J. Francia

Published by Reinhold Publishing Corp., 330 W. 42nd St., New York 18, N. Y., 1947

Price \$4.50

162 pages

Probably the best quality in this quite thorough book on the subject of low-pressure plastics is its application to economics. After all the wartime enthusiasm about low pressure, it comes as a practical textbook.

Not an operating manual, the book should rather find a place in the business library of every man who uses, or expects to use, low-pressure techniques or components.

Included are some fairly thorough references to new preform methods currently under development, which have as their objective the production of low-cost finished parts in a punch press operation.

Principles of Textile Converting

by Irving Teplitz

Published by Textile Book Publishers, Inc., 303 Fifth Ave., New York 16, N. Y., 1947

Price \$4.00

180 pages

The essential knowledge required for the converting of all types of fabric, synthetic as well as animal and vegetable, is covered in a non-technical, straightforward style in this volume. It deals with such subjects as the organization of the textile industry, fibers and yarns, construction of various fabrics, converting procedures and problems, and textile merchandising.

Concise Chemical and Technical Dictionary

Edited by H. Bennett

Published by the Chemical Publishing Co., Inc., 26 Court St., Brooklyn 2, N. Y., 1947

Price \$10.00

1055 pages

Approximately 50,000 definitions are included in this volume, covering every field of scientific and technical development. A special feature is an up-to-date compilation of tradename or proprietary products in the synthetic resin, plastics, metal, textiles, paint and varnish fields.

Dictionary of Foreign Trade, Second Edition

Revised by Frank Henius

Published by Prentice-Hall, Inc., 70 Fifth Ave., New York 11, N. Y., 1947

Price \$12.50

959 pages

Such practical information on foreign trade as that relating to selling, shipping, insurance, invoicing and credits are assembled in this volume. Additional features are its collection of nearly 300 documents used in foreign trade, a table of some 3000 foreign trade abbreviations and an unusually complete weights and measures conversion section.

Basic characteristics of useful industrial laboratory instruments—This two-page chart includes data on 15 instruments—colorimeter, cyclograph, electron microscope, photometer, photometer, spectrograph, spectrophotometer, spectro-photometer, X-ray diffraction, zygo, electron diffraction and supersonic—and may be obtained from North American Phillips Co., Inc., 100 E 42nd St., New York City. Each instrument is described as to its principal basic arrangement, operation, and application. Comments and the name of the manufacturer are included on each instrument.

Surface treatment with the Armeens and Armaes—The way in which these chemical products of Armour & Co., 1355 W. 31st St., Chicago, Ill., are used to change surfaces is given in the company's 4-page brochure. Only the hard-to-change surfaces are dealt with, such as: asphalt cut-back, inorganic pigments, polystyrenes that are too quickly charged with electricity, etc. These products may also be used as anti-skinning agents in paints and as penetrants and repellents in various materials.

Radiography in modern industry—This book, published by Eastman Kodak Co., X-ray Div., Rochester 4, N. Y., is an attractively laid out and comprehensive test of the fundamental knowledge necessary for efficient radiographic practice. Effective schematic diagrams, tables and photographs explain the industrial functions of radiography—a science providing visible film records of a product's internal condition.

Textolite laminated plastics—A booklet published by the Plastics Div., General Electric Co., Pittsfield, Mass., gives facts on the more than 50 grades of laminated Textolite in sheet, tube and rod form. It includes data on materials for bearings, silent gears, decorative surfaces and many other applications. The properties of the material are given as well as descriptions on how to fabricate the material.

Paraplex for laminating and casting applications—The Paraplex P series of resins, manufactured by The Resinous Products & Chemical Co., Washington Sq., Philadelphia, Pa., is described in this booklet that the company has just issued. This series is based on unsaturated polyesters combined with a reactive monomer and finds the greatest use in laminating and casting applications. Designated as P-10, P-13, P-33 and P-43 the resins range from unusually pliable to completely rigid in the order given. How these resins are used in casting, laminating, bonding, molding, impregnating, coating, etc., is explained. Charts and tables give the physical properties of the resins.

A glossary—B. F. Goodrich Chemical Co., Cleveland 15, Ohio, has issued a pocket-sized leaflet which lists 127 frequently used technical words, terms and phrases of both the plastic and the rubber industries.

Brushing lacquers, Pentolyn resins, CMC, Resin 731—A booklet on these subjects, Hercules Chemist No. 17 and Form 961, has been published by Hercules Powder Co., Wilmington 99, Del. Brushing lacquers are discussed, with tables suggesting starting formulas. The formulations, tests and results made with Pentolyn resins, for exterior varnishes and primer enamels, are covered. Information on CMC, the water-soluble, film-

A BUYING GUIDE FOR ABRASIVES

POINT No. 7

SATISFIED USERS



When satisfied customers are the yardstick by which a concern is evaluated, The Carborundum Company measures up well. During the many years it has supplied abrasive tools to industry...the opinions, needs and viewpoints of those it serves have been deeply respected. The results of this policy are reflected in the high regard in which the name CARBORUNDUM is held by users of abrasives.

There's a certain feeling of satisfaction in doing business with a concern on this high level of helpful cooperation. It is often expressed in the stated preference for services and abrasive products by CARBORUNDUM. The Carborundum Company, Niagara Falls, N. Y.

A Good Rule for Good Grinding...CALL IN

CARBORUNDUM

TRADE MARK

- BONDED ABRASIVES
- COATED ABRASIVES
- ABRASIVE GRAINS AND FINISHING COMPOUNDS

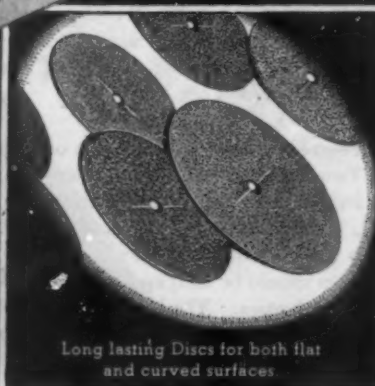


A Coated Abrasive for every sanding and finishing condition.

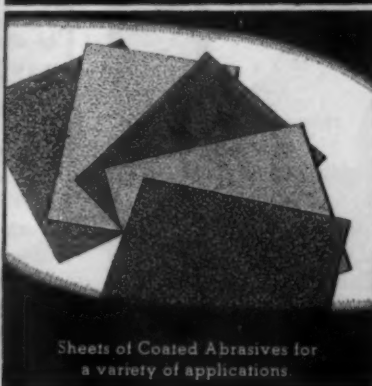
All standard shapes are supplied in grinding-wheels by CARBORUNDUM.



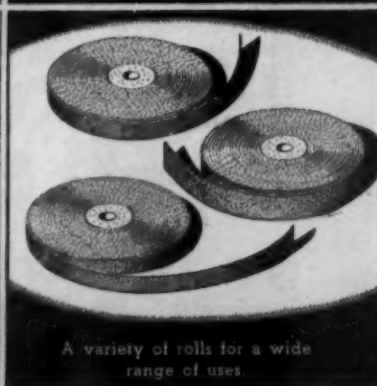
"Carborundum" is a registered trade mark which indicates manufacture by The Carborundum Company.



Long lasting Discs for both flat and curved surfaces



Sheets of Coated Abrasives for a variety of applications

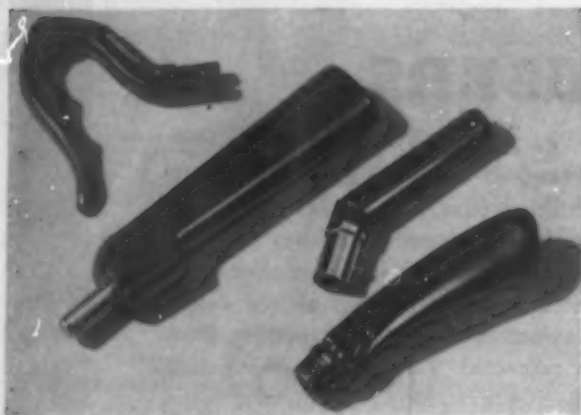


A variety of rolls for a wide range of uses

COMPRESSION AND INJECTION



Handles...



Tooled to build efficient molds for fast economical production... **Experienced** in planning and delivering millions of Customolded parts... **Skilled** in meeting precision specifications on difficult operations. Name your Customolding requirements. Midwest will measure up.



MOLDMAKERS AND CUSTOM MOLDERS

forming plastic which acts as a thickening and bodying agent, includes its properties and uses. Resin 731, which made possible the synthetic rubber, GR-S-10, is also discussed.

New profits through sensible depreciation—The factor of obsolescence in figuring depreciation of productive equipment, or machine tools, is simply and graphically presented in this booklet distributed by Kearney & Trecker Corp., Milwaukee 14, Wis. Because matters concerning wages, prices and production are inseparably linked with the efficiency of machine tools, the booklet explains these connections and offers suggestions to plants for solving their cost-of-production problems.

Mechanical handling of paper, cloth, etc.—In Bulletin No. 120, John Waldron Corp., New Brunswick, N. J., gives general information concerning the mechanical handling of paper, cloth, artificial leather, transparencies and materials to be processed in web form. The bulletin is fully illustrated and contains references to equipment for unroll, tension control, converting, festooning, conveying, guide winding.

Synthetic resins and allied products—Catalog No. 772 lists the products of Alkydol Laboratories, Inc., 3242 S. 50th Ave., Cicero 50, Ill., in a well-organized, simplified method. Constants of solution, driers recommended and the drying and film properties of each of the company's 29 alkyd resins are given. Information on the ester gums and phenolic resins includes: characteristics, solubility, compatibility and recommended uses. Subject and "suggested use" indexes make information easily available.

Dutrex for the coating material industries—Shell Oil Co., Inc., 50 W. 50th St., New York City, has just released this booklet, its latest on its Dutrex resinous plasticizers and film-forming extenders. Comprehensive tables, charts and pictures explain the composition of the material, its properties, how it is used in lacquers, varnishes, tung oil, paints, adhesives, binders.

Res-O-Dors—The ten formulations of this agent, used to impart a pleasing fragrance to products made of plastic-coated materials, are described in Technical Bulletin 47-3 of Givaudan-Delawanna, Inc., 330 W. 42nd St., New York City. These agents are inexpensive and easy to use and will not affect the plastic material. They can be used in a wide variety of plastic-coated materials such as those used for food covers, umbrellas, toy coverings, shower curtains and automobile upholstery.

The improved surface pyrometer—An all-purpose instrument, the Pyro, with interchangeable extension arms and thermocouples, is described by the Pyrometer Instrument Co., 103 Lafayette St., New York City, in their catalog No. 160. Any surface (metallic or non-metallic) temperature may be measured by the instrument that is made to withstand rugged treatment while giving precise measurements.

Striated plywood panel—Weldex, designed for use in homes, offices, restaurants and commercial establishments, is a moisture-proof and waterproof striated plywood panel. An illustrated brochure on this material, to aid paneling plans and problems, may be obtained by writing to United States Plywood Corp., 55 W. 44th St., New York City.

Radio frequency heating and use of glue in prefab operations—Two bulletins just recently received are from the Technical Service Div., Casein Co. of America, 350 Madison Ave., New York 17, N. Y. The publications of this Div. of the Borden Co. cover the use of radio frequency heating for gluing wood—what kind of glues should be used and how—and also the uses of glue in prefabricated houses. The latest methods of applying the bonding agents and up-to-date techniques for applying pressure and speeding the curing of the adhesives are described in the pamphlet "Glued Prefabricated Houses." (Please turn to next page)

ORGANIC PEROXIDES

CATALYSTS FOR POLYMERIZATIONS
DRYING ACCELERATORS • OXIDATION AGENTS • BLEACHING AGENTS


LUCIDOL
(BENZOYL PEROXIDE)

LUPERCO
(PEROXIDE COMPOUNDS)

ALPEROX C
(TECHNICAL LAUROYL PEROXIDE)

LUPEROX
(PEROXIDE PASTES)

Special Organic Peroxides

REGISTERED

TRADE MARK

LUCIDOL DIVISION

NOVADEL-AGENE CORPORATION
BUFFALO 5, NEW YORK

AVAILABLE NOW

Embossed designs on Vinyl Film

By an exclusive process that we have developed, you can now get precise and beautiful designs on .004 to .025 gauge unsupported films or on all coated fabrics. Pyroxylin, vinyl, the organosols, as well as polyethylene and polythene from .0025 gauge up can be embossed in up to 54 inch embossing widths.

This unique process of roller molding embossing adds beauty and decorative appeal to plastic film or coated fabrics. Many standard designs are available for you to choose from.

We shall be glad to show you samples of embossing done on a wide range of materials. We shall also be glad to quote you on embossing one of our regular designs—calf, skiver, levant, colonial, or crepe pin seal—on your material—or in making up an entirely new design according to your ideas.

Write or phone—

J. J. Brown & Co., Inc.

2017 Lower Road

Linden, N. J.

Linden 2-7390

HOPP *Plastics*

EXTRUSION MOLDING: Continuous lengths, in any form, cut to any length.
INJECTION MOLDING: Small to medium sized objects molded to any desired shape to meet your specifications.

LAMINATING with layers of transparent plastics to hermetically seal printed surfaces against moisture, oil and water.

FABRICATING: Wide variety of sheets, flexible or rigid, dull or glossy finish. Wide color range.

DIE CUTTING to any shape desired, done right on our premises.

PRINTING: We specialize in printing where extremely close register is imperative.

FORMING OF Sheet Plastics to any desired shape.

EXTRUSION MOLDING

INJECTION MOLDING

LAMINATING

FABRICATING

DIE CUTTING

PRINTING

FORMING

THE HOPP PRESS

INCORPORATED

460 W. 34th ST. NEW YORK 1, N. Y.

ESTABLISHED 1893

18 MONTHS
Continuous Operation...
MOLD REPOLISHING
Eliminated!



The extra advantages you get with a mold steel often spell the difference between high and low mold costs—perfect or "passable" molding results. These plastic comb molds are shining examples. The use of a corrosive plastic made Stainless Mold Steel a "natural". The molds gave 1½ years' continuous service—and required no repolishing! And the high strength, cleanness, ease of ejection—the extra advantages of a Carpenter Stainless Mold Steel—assured top mold performance.

For lower unit costs and improved mold results, put all the advantages of Carpenter Stainless Mold Steels to work. Contact your Carpenter representative for complete information, today.

The Carpenter Steel Company,
 112 W. Bern Street, Reading, Pa.

BECAUSE THIS MOLD STEEL
GAVE MORE THAN
Corrosion Resistance!

AVAILABLE FROM WAREHOUSE STOCKS!



Carpenter
 ELECTRIC FURNACE
MOLD STEELS
 100% ACID DISC INSPECTED

Information on high vacuum distillation—The methods of molecular distillation, as well as a description of the laboratory equipment employed, are put forth in this well-illustrated presentation of Distillation Products, Inc., 755 Ridge Road West, Rochester 13, N. Y. The two methods include ordinary distillation and short-path distillation. Various stills, produced by the company and described in this booklet, are: pot type, thin layer (gravity and centrifugal) types, and intermediate laboratory stills. A bibliography of literature on distilling is also listed in a section of this booklet.

Reports and data on German patents and research in the textile industry—Research Information Service, 501 Fifth Avenue, New York 17, N. Y., has been authorized by the Department of Commerce to translate and publish information on German research. A complete listing of presently available translations, together with the charges for this information may be obtained from the firm.

Abrasion-testing aids—Four newly improved abraser accessories as well as a complete line of specialized accessories for use with the Taber abraser are covered in Bulletin 4702. Available from the Taber Instrument Corp., 111 Goundry St., North Tonawanda, N. Y., this brochure reviews such attachments as a vacuum pickup unit for continuously removing abrasings from wear-track on specimen being tested and an interval timer to control test operating period.

Building savers—A 16-page catalog to help maintenance engineers, contractors and builders in product selection for all types of industrial and residential buildings has been issued by the Building Products Div., L. Sonneborn Sons, Inc., 88 Lexington Ave., New York City.

Versatility—The many applications that can be molded of Beetle are described and profusely illustrated in this publication of British Industrial Plastics Ltd., London. Special attention is also given Beetle cements, resin binders, coating resins and textile and paper resins.

Many British companies engaged in the plastic industry have contributed in furnishing illustrative and informative material for this booklet which is printed on fine stock, has a pleasing appearance and an excellent format.

Coated abrasives—A handbook and digest of coated abrasive technology, written by E. B. Gallaher, has been published by the Clover Mfg. Co. The importance of coated abrasives in the production of plastic, metal, wood and leather products is especially stressed and installation photographs supplement the comprehensive text. This booklet may be obtained for 25 cents from the company, Norwalk, Conn.

Multi-operation chucking machine—Complete information about the recently introduced Hardinge multi-operation chucking machine is presented by Hardinge Brothers, Inc., Elmira, N. Y., in a new publication.

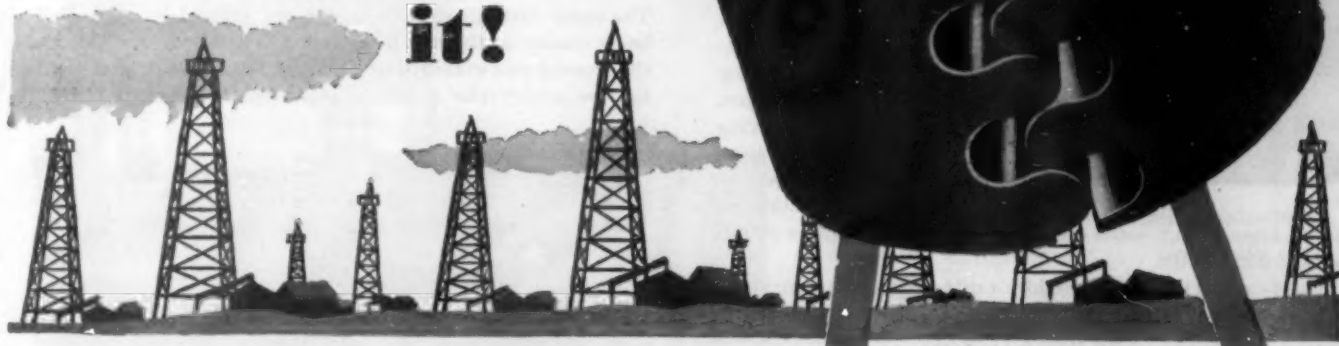
Controlled bending of thin metals—The Chicago Metal Hose Corp., Maywood, Ill., have announced the availability of their new G-47 catalog defining and explaining the science of "Flexonics" or controlled bending of thin metals for use under varying temperature, pressure and corrosion conditions. Separate sections of the catalog are devoted to the various products made by the company.

Tool catalog—A supplement (GT-199) to its catalog (GT-175R), listing new products, specifications and price changes, has been issued by and is available from Carboly Co., Inc., Detroit 32, Mich. Included in the listing is a new line of standard solid boring bars.

The engineers of Los Angeles
Standard Rubber, Inc. had
a particular need to meet
... and here's how

PERBUNAN met

it!



The "particular need" was this: a material had to be found for Super-Lock Gland Packings that would stand up under the *extra-tough* service of oil-field work...would permit *precision* fabrication into the unique design developed for quick installation...and have remarkable *resistance* to heat, oil, water and frictional wear.

The engineers and rubber technologists of LOS ANGELES STANDARD RUBBER, INC. worked together on the problem...ran exhaustive tests...and picked Perbunan because it met every need under actual test *in the field*!

A NEW STABILIZER has now been added to Perbunan that also allows it to be used in a wide variety of colored articles...especially where delicate colors are used...and where discoloration of the rubber part or the material would be objectionable.

If you would like us to suggest ways that Perbunan-made parts can meet *your particular needs*...please write to the Enjay office nearest you.



**THE RUBBER THAT RESISTS
OIL, COLD, HEAT AND TIME**

ENJAY COMPANY, INC., 26 Broadway, New York 4, N. Y.; First Central Tower, 106 South Main Street, Akron 8, Ohio; 221 North LaSalle St., Chicago 1, Illinois; 378 Stuart Street, Boston 17, Massachusetts. West Coast Representatives: H. M. Royal Inc., 4814 Loma Vista Avenue, Los Angeles 11, California. Warehouse stocks in Elizabeth, New Jersey; Los Angeles, California; Chicago, Illinois; Akron, Ohio; and Baton Rouge, Louisiana.

Copyright 1947, Enjay Company, Inc.

New Machinery and Equipment

Two-oz. and 4-oz. vertical injection molding machines—Watson-Stillman Co. of Roselle, N. J., has announced Model 2E-36, a 2-oz. vertical injection molding machine, and Model 4E-100, a 4-oz. vertical injection molding machine. Both are completely hydraulically operated machines. The 2-oz. machine



is arranged for motor drive and powered by vane-type oil pumping equipment. It is manually controlled, possessing all the features of larger molding machines with the exception of automatic cycling. Specifications include: plasticizing capacity of cylinder per hour, 25 lb.; maximum cycles per hour, 300; injection pressure per sq. in., 19,000 lb.; maximum hydraulic system pressure, 1200 lb.; clamping capacity, 36 tons; daylight opening, 15 in.; minimum

die thickness, 7 in.; rated maximum power consumption of heat units, 2.0 kilowatts.

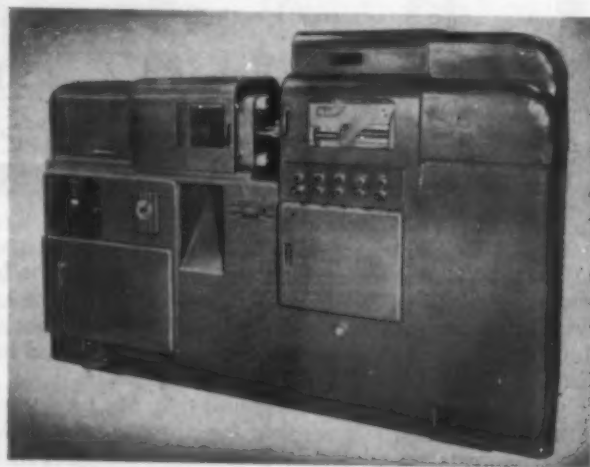
The 4-oz. machine is powered by a rotary type oil pump and is furnished complete with valves and all electrical equipment including the motors. Two Wheelco Electronic indicating Capacitor instruments are standard equipment. The feeder is of the self-compensation type. Mold setup time with the straight hydraulic clamp and horizontal platens is reduced to a minimum. The four-column design permits full accessibility to the mold and for mounting auxiliary molding equipment. Specifications include: plasticizing capacity of cylinder per hour, 40 lb.; maximum hydraulic cycles per hour, 360 lb.; injection pressure per sq. in., 27,000 lb.; maximum hydraulic system pressure, 2000 lb.; clamping pressure, 100 tons; daylight opening, 22 in.; minimum die thickness, 10 in. and rated maximum power consumption of heat units, 3.6 kilowatts.

Gap frame hydraulic press—A 20-ton gap frame hydraulic press adapted to all metal forming operations within capacity as well as drawing, bending, straightening, forcing, riveting, crimping, piercing, staking and assembly has been announced by the Northern Tool & Machine Co. of Melrose Park, Ill. Of all steel welded construction, this portable, self-contained unit occupies 18 by 36 in. of floor space. It has 8 in. of throat, a 12-in. stroke and a platen 12 by 17 inches.

Variable speed transmission—The Oilgear Co., 1301-1417 W. Bruce St., Milwaukee 4, Wis., has introduced a new variable speed transmission suitable for wire coating and rewinding machines, small draw benches, grinding wheel head drives, starch machine

conveyors, carriage drives, etc. To accommodate the cycle and functional requirements of a wide variety of applications, this transmission has hand screw control for setting of output shaft speed, a hydraulic servo-motor lever control for instant and stepless variation of output shaft speed in either direction, a hydraulic two-speed control and electric three-position remote control. It has an input speed of 1750 r.p.m. maximum, output speed variable up to 1600 r.p.m., starting torque of 125 in.-lb. and normal continuous torque of 90 in. pounds.

Injection molding machine—The Fellows Gear Shaper Co., Springfield, Vt., has announced the Fellows-Leominster 1B-2 injection molding machine which has a molding capacity of 2 oz. per shot and plasticizing capacity of 45 lb. per hour. These features, together with the 30-in. casting area, 150-ton clamp, 5-in. stroke and ample platen area for molds up to 10½ by 13½ in. or a No. 2 D.M.E. standard mold base, make the machine suited for production runs of small hardware, jewelry, novelty and industrial items. The injection head is mounted on a movable slide, hydraulically actuated and mechanically locked while molding. Changeovers for different materials or colors are simplified due to the hinged hopper. One main feature of this machine is the design of the separator and the heating cylinder. The outer circumference or fins on this separator are tapered—being smaller at the nozzle end—and are made to accommodate the tapered bore in the heating cylinder. Between the separating fins are semicircular channels or grooves, the bottoms of which



are located equidistant from the axis of the separator. This type of separator and cylinder design facilitates the flow and uniform plasticizing of the material. A perfect fit is said to be maintained at all times between the two components preventing the lodging of any material between the fins on the separator and the walls of the heating cylinder.

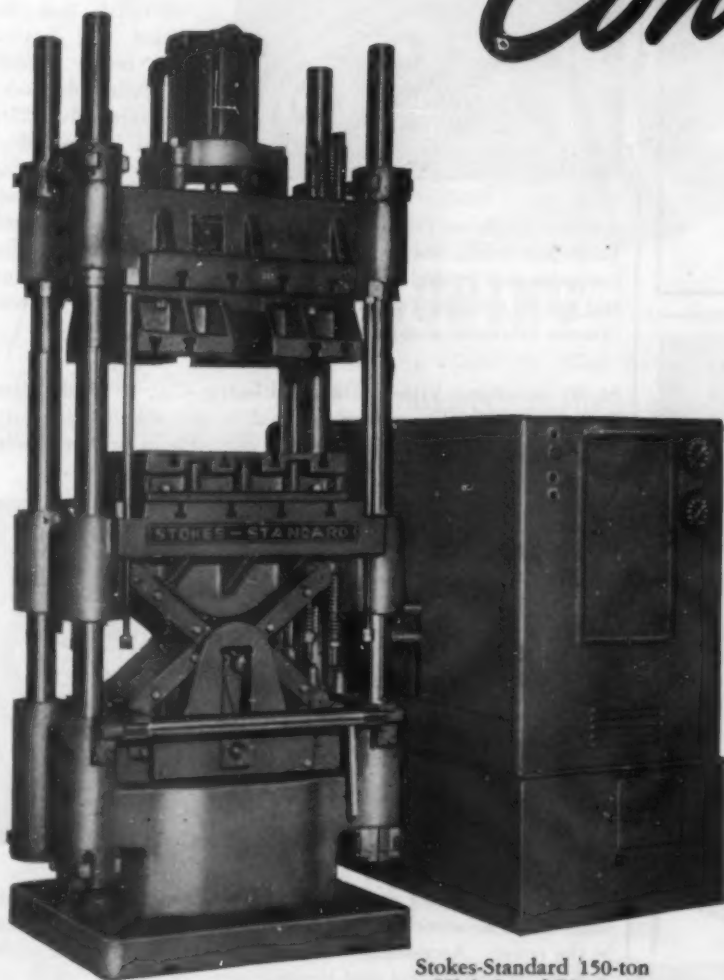
Sorry!

In the machinery item on the Dodge expanding insert put out by the Phelps Mfg. Co., 48 Leavenworth St., Waterbury, Conn., which appeared on page 172 of the July issue, the name of the company was incorrectly carried as the Dodge Mfg. Co.

(Please turn to the next page)

ONLY STOKES OFFERS THESE ADVANTAGES
ON HIGH SPEED PLUNGER MOLDING PRESSES...

- *Toggle Lock*
- *Bar-type Controller*



Stokes-Standard 150-ton
High Speed Plunger
Molding Press

Stokes High Speed Plunger Molding Presses offer two important advantages to users of the increasingly popular plunger, or transfer, molding technique.

TOGGLE LOCK — used so successfully on thousands of injection presses — provides positive lock . . . low hydraulic pressures . . . high *molding* pressures with low power input.

BAR-TYPE CONTROLLER — exclusive on Stokes Presses — permits maximum *flexibility* of operation . . . *simplicity* of cycle set-up . . . high *reliability*.

OTHER STOKES FEATURES—heavy-duty construction . . . completely self-contained . . . easy to install.

These presses can readily be used for ordinary compression molding.

Available in 50 and 150 ton capacities. Described in Bulletin 477. We invite your inquiry.

F. J. STOKES MACHINE CO.

5934 Tabor Road, Philadelphia 20, Pa.

Branch Offices in New York and Chicago

F. J. Stokes

MOLDING EQUIPMENT



SYREX PLASTICS

PHENOLIC RESINS
CAST RESINS
RESINS for LAMINATIONS



CELLULOSE ACETATE
MOLDING POWDERS

ETHYL CELLULOSE
MOLDING POWDERS

POLYSTYRENE
MOLDING POWDERS

Canadian Manufactured Products

By

SYNTHETIC RESINS LIMITED
GALT, ONT., CANADA

STAINLESS STEEL "PERI-CASTING"

4 weeks from the day . . .

we receive your masters, you get your "Peri-cast" cavities and cores, the NEW way to keep in step with the tempo. This means:

1. you have saved months of tooling.
2. you can work it for fit easily and quickly.
3. you have an accurate mold, 25% stronger than ordinary die steel (comparable to A.I.S.I. No. 420 stainless steel).
4. we reproduce the master with hair-line accuracy.
5. you can start production weeks ahead.

Write for Complete Data

Elmer C. Maywald

& COMPANY Inc., 11 S. LaSalle St., Chicago 3, Illinois

Sub Agents for: Michigan, Indiana, Illinois, Wisconsin, Iowa

Dryer-preheater—The A-C Co., 913 Meridian Ave., South Pasadena, Calif., has introduced a dryer-preheater which is available in a two-pan and a three-pan model. Using this machine, contents are thoroughly mixed and agitated throughout the heating process.



Because of this agitating system, there is said to be no balling or hardening of the material, or hot and cold spots. Removable trays on both models have a capacity of 15 to 20 pounds. The two-pan A-CO dryer-preheater will serve any 8- or 9-oz. machine using full capacity shots. Material is preheated to 150 to 160° F. and about 40 to 50 lb. of material can be dried and heated per hour. Each bank in this model contains five 250-watt infrared drying and heating lamps. A separate


switch controls each bank of lights, insuring positive heat control. Three-pan model features six 250-watt infrared drying-heating lamps to each bank. It has a capacity of 75 to 85 lb. per hour and can be used for two or more presses or can be used for continuous extrusion molding.

Shaft machine kits—Foredom Electric Co., 27 Park Place, New York City, has announced that its portable heavier duty-flexible shaft machine kits are now available in prewar quality and quantity.

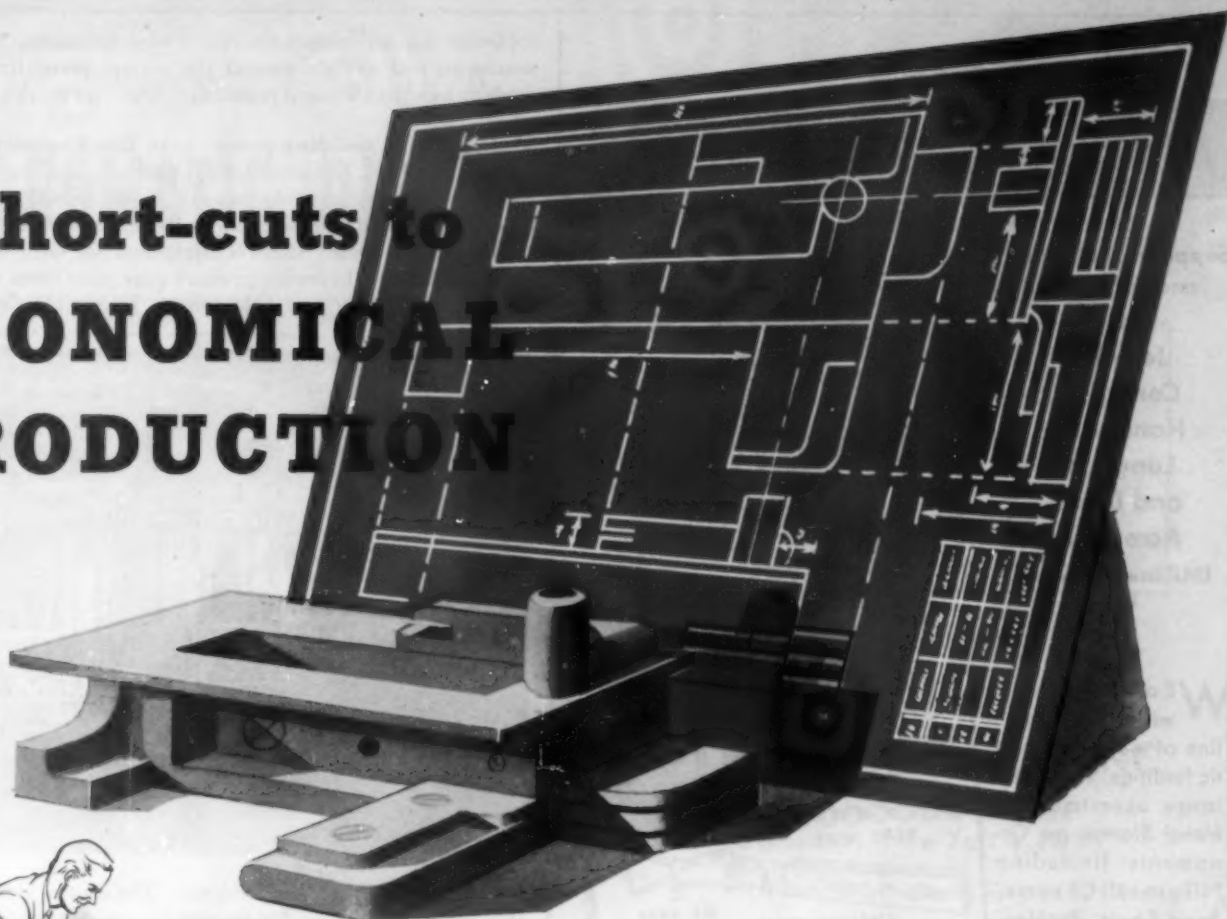
If desired, the steel carrying case can be mounted to the back of a work bench, keeping equipment dust-free when not in use. A receptacle is provided for an extra handpiece, should the operator want to use two different types with the same machine.



Sixty mounted accessories are supplied, plus an assortment of extra unmounted accessories in a transparent plastic case which seats in the cover. Accessories include burs, cutters, grinding wheels and points, bristle and wire brushes, saws, buffs, sanding drums, sanding disks and rubber abrasive mandrels.

All-purpose clamp—Trico Fuse Mfg. Co., N. Fifth at W. Chambers streets, Milwaukee 12, Wis., has introduced the U-66 all-purpose Kliplok clamp which can be attached to ends of cords on portable equipment such as sanding machines, saws, drills and welders. It supplies a vise-like grip on flat or round objects up to 1 in. in diameter, such as fuse clips, meter or motor terminals, lugs, screws and battery posts. The clamp will carry up to 150 amperes continuously and 200 amperes intermittently. 

3 short-cuts to ECONOMICAL PRODUCTION



EXTRUDING—You can depend on Plastex for the experience and ability to accurately produce all plastic extrusions to the most exacting specifications of your blueprints.



FABRICATING—Plastex engineers cooperate with you in designing and selecting the right materials to give you the greatest satisfaction in fabricating plastics and other materials.



ASSEMBLING—Experienced Plastex workers help you save time and money on final assembling, either of the completed product or a unit. Our central location reduces shipping costs.

Plastex engineering and tool shop facilities are immediately available for consultation and development service. Contact Plastex today.

PLASTEX

THE PLASTEX CORP. • COLUMBUS 3, OHIO

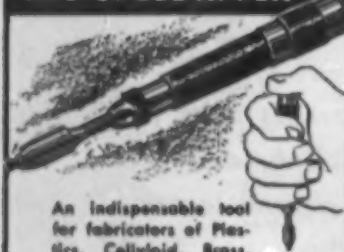
FINDINGS WHAT YOU NEED WHEN YOU NEED IT!

Suppliers for Molders
and Fabricators
of
Jewelry
Compacts
Handbags
Luggage
and Dress
Accessories
(Millinery, Shoes,
Belts)

WE are known for the wide variety of our line of metal and plastic findings. We have a large assortment of Metal Stampings, Ornaments (including Filigree), Charms, Bead Chain, Buckles, Fancy Wire, Wire Formings, Hinges, Plastic and Metal Beads, Fancy Chain, etc., for every kind of trimming, novelty and decorative use.

Address Dept. G-8

The SPEEDRIVER



An indispensable tool for fabricators of Plastics, Celluloid, Brass, Iron, etc.

Magnetic tip holds drive screw in place for driving. Hardened steel spring action drives it in. Adjustable for light or heavy drive—will not break plastic material while driving the screw.

Durable—long lasting—A time and labor saver—Use it once and you will not want to get along without it.

Send for folder.

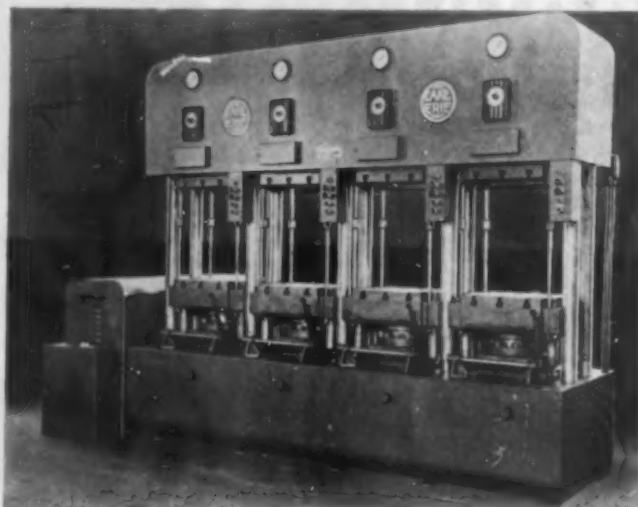
MARTIN M. STEKERT

45 WEST 34th ST., NEW YORK 1, N. Y.



solderless lug accommodates No. 2 wire minimum, No. 0 wire maximum and swivels around the clamp, permitting wire or cable to hang in a natural position.

Multiple-unit molding press—Lake Erie Engineering Corp., Buffalo 17, N. Y., has introduced a four unit molding press with four double acting upstroke rams of 50-ton capacity each, operated by a central pumping unit and equipped with individual pushbutton controls. Control equipment for each of the four units consists of a hydraulic pressure gage, cure timer with signal light, breathe timer and hold timer. Levers are provided for



operating the stripper mechanisms. The control system enables the operator to set up for inching or semi-automatic operation and single or double breathing. Hold and breathe periods are adjustable from 3 to 60 sec. and cure period is adjustable up to 20 minutes. Hydraulic pressure on the four rams is individually adjustable up to a maximum of 50 tons. The press is 12 ft. 9 in. long by 8 ft. high. Each of the four platens measures 18 in. square. Daylight between platens is 24 in. and each ram has a 12-in. stroke.

Spring hinge—A spring hinge designed for use in plastic boxes and permitting precision installation of lids without gaps between lid and box has been developed by Cavu, Inc., Box 392, Downey, Calif. Installation requires no special jigs or fixtures, latch,

rivets or drilled holes. It fits either 90 or 180° opening covers.

Boxes for such items as jewelry, razors, cosmetics, small tools, shaving kits, accommodate the hinge by means of small, coordinated cavities molded into the sidewall of the box and lid.



Made of 1075 or 1095 spring steel that is formed in a multiple-stage die, heat treated and nickel plated before assembly, the hinge cam and spring-leaf halves are held together by a steel wire pin. The pin is held in place by tension of the spring against it.

Two spring-loaded prongs are formed into the outer edges of each anchor of the hinge. They bear against the wall surface of the cavities molded in the sidewall of box and lid, securing the hinge in place. To attach, hinge anchors are forced into the cavities, the prongs biting into the cavity walls. Sizes from 3/8 in. up are available.

Glance at Some Typical Properties of

AROMATIC DISTILLATES

(HIGH-BOILING AROMATIC HYDROCARBONS CONSISTING LARGELY OF UNSATURATED POLYMERS RECOVERED IN THE DISTILLATION OF PETROLEUM)

Properties	Aromatic HB	Aromatic L	Aromatic H
Specific gravity, 60°/60°F.	0.950	1.043	1.070
Flash, Cleveland Open Cup, °F.	214	255	290
Viscosity, S.U.S. @ 210°F.	13	48	155
B. S. & W., %	0.1	0.2	0.7
Pour Point, A.S.T.M., °F.	< -20	-15	34
Iodine Number, Wijs	106	121	117
Unsulfonated Residue, A.S.T.M., %	20	6	6
Vacuum Distillation (corrected to atmospheric pressure)			
10%, °F.	464	498	528
50%, °F.	494	600	670 (cracked)
Color	Dark	Dark	Dark

**Unlimited Quantities
Available in Three
Boiling Ranges**

● Suggested uses: Low-cost paints and varnishes, printing inks, core oils, shingle stains, bituminous and asphaltic paints, saturating asphalts, flotation oils, soil sterilizers, rubber compounding, electrical insulation, insecticides and fungicides.

● Write for Samples and Complete Information

ENJAY COMPANY, INC.

(Formerly Standard Alcohol Company)

"The Original Synthetic Solvent Manufacturers"

26 Broadway, New York 4, N. Y.

Mid-West Division

221 North LaSalle Street, Chicago 1, Illinois

at the Service of Industry

THE INJECTION METHOD OF MOLDING THERMOPLASTICS

... for speed
... for precision
... for economy



Service to you at the Injection Molding Company includes far more than the process of fabricating thermoplastics.

Many nationally-known manufacturers have found our creative staff of engineers and designers have been able to help them solve their knottiest problem in thermoplastics. And above all, they have found our own die making and production facilities, and our central location has enabled them to receive shipments of the finished plastic product sooner than they believed possible.

Possibly you have an intricate creation in plastic that is troubling you. Write us for our ideas, perhaps we can help you, too.

INJECTION Molding COMPANY

3823 INDEPENDENCE AVENUE, KANSAS CITY 1, MISSOURI

Letters

Vinyl paste in England

Our British correspondent spent some time checking up on the results obtained from uses of vinyl paste in England. After talking to various processors he has sent us the following summary of his observations:

1. Paste spreaders claim that doctor blade coating is more economical than calendering since the paste is spread cold and does not require heated calender rollers.

2. Calenderers claim that their bond is the stronger since the compound is forced into the interstices of the fabric. They admit, however, that to make the bond effective they have to lay an anchor coat first. The paste spreaders claim that their bond is the better for the paste seeps into interstices before gelation sets in.

3. For speed of fabrication the upholstery trade tear their leather cloths. They do not cut the strips necessary for covering the narrower parts of chairs, such as the arms. Therefore a leather cloth, whether cellulose nitrate or P.V.C., must tear straight. This will only happen if the fabric backing can tear straight. The paste spreaders claim that their method avoids all danger of distortion in the fabric backing because little pressure is exerted on the backing. They say that a careless or unskilled calender operator can give a twist to the fabric backing so that the warp and weft are not at right angles. Upholsterers look at the back side of a coated fabric before they look at the face to see whether the fabric is distorted. If it is they know that the tears will not go straight and they reject the material.

4. The amount of tackiness permissible in a sheet for curtaining would rule out a material for upholstery. Lord Nuffield (*our Henry Ford*) has taken a personal interest in P.V.C. coated materials for his car upholstery but turned down the first batches shown him on account of this tackiness, for in an automobile it is essential to have a dry and glossy surface for sliding in and out (an important point in small cars). This tackiness can be removed by a top dressing of a synthetic resin emulsion specially prepared for the job. This emulsion is spreadable by the same coating machine after the P.V.C. coat has gelled. It does not add much to the coat and is, in fact, a very necessary finish.

5. Vinyl Products Ltd., makers of Vinatex paste (from I.C.I. Corvic polymer) started paste making three years ago. They say the development of paste was due in the first place to shortages of solvents necessary for calendering compound. They have a range of

This letters section, which will appear periodically, is devoted to excerpts from letters that seem, to the editors, to be of significance to the industry

a dozen standard pastes of varying viscosities. Between 80 and 90 percent of their paste goes into the coating of leather cloths.

6. They say pastes are more economical than compounds for no building up of coats is necessary. The desired coating thickness can be achieved with one run through by setting the doctor blade to the required thickness.

7. To give a mat finish keep the curing temperature low and give longer time in oven. Raise temperature and reduce time for a gloss finish. A rough guide to normal practice would be one minute at 150° C. per 1/2 millimeter.

8. Ultimate tensile strength of a paste film varies according to the time and temperature of heating and ranges from 1000 to 2000 lb. per sq. in.

PAUL REILLY

A housewife wants plastics

Sir:

If they do not already manufacture the following items, may I suggest that I and perhaps a few million housewives would appreciate it if the plastics industry would manufacture:

- 1) Small kitchen garbage receptacles (with push-up lid)
- 2) Large outside garbage cans
- 3) Trash baskets

No matter what precaution I take, such as using a paper bag in the garbage can, and wrapping all garbage in paper, I have a constant battle with rust. Frequent painting of can does not help a great deal.

MRS. J. C. FRANKLIN
Buckroe Beach, Va.

Plastics vocational school

Sir:

About two years ago a plastic course was set up in the Leominster public school system in conjunction with the high school and trade school. Due to conditions which were unforeseen at the time, the plan and course itself were a failure.

After almost two years of effort on the part of a group of manufacturers interested in the plastic industry a technical institute has now been approved for the sole



"Hands-Off" Visibility

NO need to choose between *protecting* merchandise against shopwear, dust, handling . . . and *displaying* it prominently, invitingly, so that customers simply can't pass it by. Not any more!

Packages fabricated of the thicker-gauge Kodapak provide all the protection any merchant could ask for. At the same time—thanks to their transparency, their sparkling optical clarity—they display products at their best . . . show them attractively, in their true colors . . . offer customers a standing invitation to stop, look, and buy . . .

Kodapak, cellulose-ester sheet, is supplied in two

forms—Kodapak I, cellulose acetate, and Kodapak II, cellulose acetate butyrate. The latter, available only in thinner gauges, has many applications of value in industry.

The current supply of Kodapak is not sufficient to meet the continually increasing demand. But the Kodapak Demonstration Laboratory, in Rochester, is always available to demonstrate practical fabrication methods and end uses.

Cellulose Products Division
Eastman Kodak Company, Rochester 4, N. Y.

Kodapak

Attracts . . . Protects . . . Sells

T. M. Kodapak Reg. U. S. Pat. Off.

Kodak

ARE YOUR PLASTIC PRODUCTS TOUGH ENOUGH?



There's a *right* plastic for every job. The Ideal Novelty & Toy Company, Inc.—creator of the Magic Skin Doll—uses Celanese cellulosic plastics to give unbreakable toughness and high quality to the doll's head. For more about plastics toughness see page 11.

Celanese^{*} PLASTICS

*Reg. U. S. Pat. Off.

INSURE AGAINST ERRORS WITH PLASTIC MODELS



If you want to eliminate the "bugs" from your products before molding, have Stricker-Brunhuber construct a plastic pre-mold model for you.

With these test models your entire organization will be able to pre-check the product. You will be able to test for sales appeal, workability, mechanical accuracy. You will forestall the need for costly alterations in hard steel molds.

Our more than 25 years of experience is your assurance of quality work.

We also furnish

COMPRESSION AND INJECTION MOLDS

STRICKER-BRUNHUBER CO.

Mechanical Developers

19 WEST 24th ST.



NEW YORK 10, N. Y.

WASING 9-0191

purpose of training technicians for the plastic industry. This institute is State financed and operated separately from the public schools in Leominster with the exception that included in a board of directors are two members of the Leominster School Committee. Included in this board of directors are: Mr. Joseph Foster of the Foster-Grant Company and I, acting as representatives of the plastics industry; two members representing labor in the plastic industry; the secretary of the local Chamber of Commerce, the Director of the Institute and the Superintendent of Schools.

A real program is outlined which will include various phases of the plastic industry such as molding of all types, mold design, mold making, sample making, laboratory technicians, etc. A sum of money is expected from the State and Federal Governments which will purchase necessary equipment including injection molding machine, extrusion machine, laboratory equipment and special tool-making equipment for making molds. This new institute will allow people from all over the world to enroll and being established in a city which I still feel is the center of plastics, it will have at its fingertips a source of experience that will be of tremendous advantage to the institute.

J. A. KAVANAGH, vice-president
Standard Tool Co.
Leominster, Mass.

ANOTHER PLASTIC FLOOR COVERING, called Flor-Ever, has been brought on the market by the Delaware Floor-Products, Inc., of Wilmington, Del. Produced in solid and mottled colors, the covering is made of Vinylite plastics which is given a waterproof asphalt impregnated felt back to minimize the amount of labor and expense involved in its laying.

According to the manufacturer this new vinyl floor covering will be competitive in price with present linoleum for the home. Available in continuous lengths, the flooring now being brought out is designed for home and office use. It is possible that it may be made in a heavier weight sometime in the future. The same glue that is now used in the laying of linoleum may be used with this vinyl product.

Objective testing laboratory reports state that this covering is extremely wear resistant and is inert to alkalis or acids found in cleaning agents. It possesses good flexibility, according to these tests, does not chip or crack and will not support combustion.

Do you have a Molding Problem?

Cleveland Container INJECTION MOLDING METHODS AND NEW CLEVELON-H MATERIAL make "tough ones" easy.

Better products at low costs that compete favorably with glass, porcelain, die castings and wood turnings.

CHECK YOUR REQUIREMENTS against these CLEVELON-H "Plus Factors"

LOW COST . . . 25% of most thermosetting plastics, or lower

HIGH IMPACT STRENGTH

LARGE QUANTITY CAPACITY . . . 64 oz. presses in two plants . . . rapid cycle for low unit tooling cost

TEMPERATURE RESISTANCE . . . better than most thermoplastics

SHIPPING COSTS CUT . . . density 1.3 (a fraction of glass or zinc)

LOW MOISTURE ABSORPTION . . . good weatherability

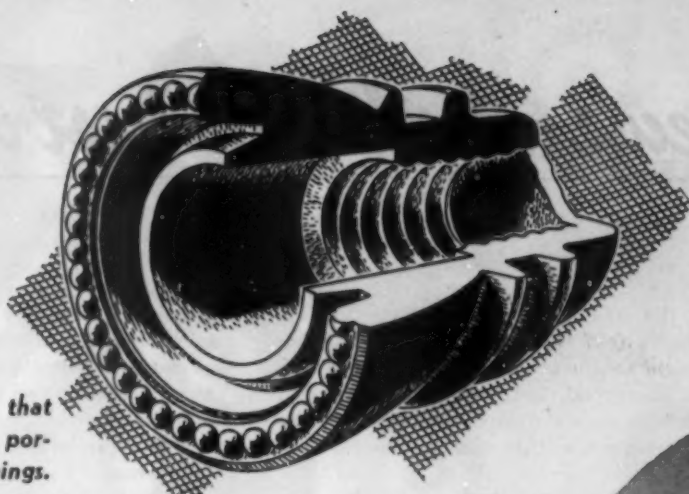
DESIGN FLEXIBILITY . . . note inside threads

FINISHING COSTS LOW . . . may be beautifully lacquered, metal-plated, wax-coated or used unpainted

MOLDING KNOW-HOW . . . to take care of your item from idea stage to large scale production in minimum time

Let us examine your industrial application problem for suitability of using CLEVELON-H.

Write our Plymouth, Wisc., Plant for samples and further information.



Fusee Plugs
Farm Fence Knobs
Piano Rolls
Flag Spear Tips
Panel Plates
Wheels
Plastic Parts for later assembly



The **CLEVELAND CONTAINER Co.**
6201 BARBERTON AVENUE CLEVELAND 2, OHIO

PRODUCTION PLANTS also at Plymouth, Wisc., Ogdensburg, N. Y., Chicago, Ill., Detroit, Mich., Jansburg, N. J.
PLASTICS DIVISIONS at Plymouth, Wisc., Ogdensburg, N. Y. • ABRASIVE DIVISION at Cleveland, Ohio
New York Sales Office—1185 Broadway, Room 223

IN CANADA—The Cleveland Container Canada Ltd., Prescott, Ontario

**CREATIVE ARTISTRY
TRANSFORMS
PLASTICS INTO GOLD or SILVER**

Masterpieces in costume jewelry—spray pins, lapel pins, earrings, and barrettes—can be made of plastics or various types of metals. Exquisitely plated in brilliant gold or silver.

Interstate's finishing process sheathes the surface of molded plastics or metal to produce striking costume pieces of unusual beauty.

Interstate products co.
160 FIFTH AVENUE, NEW YORK 10, N. Y.
Watkins 9-3030-1, 2, 3, 4

News of the Industry

The Chemical Plants Div. of Blaw-Knox Co., Pittsburgh 12, Pa., has contracted with Swift & Co. covering the construction of a modern chemical plant for the processing of fats. The new plant, to be located at Hammond, Ind., will produce glycerin for use in making synthetic resins and pharmaceuticals, and fatty acids for making soaps, cosmetics and chemical products.

Rohm & Haas Co., Washington Sq., Philadelphia, Pa., has announced a price reduction in its acrylic plastic molding powders. In quantities over 2000 lb., the new price of clear material is 70 cents a lb.; colored material is now 75 cents a lb. in quantities over 5000 pounds.

Fairchild Engine & Airplane Corp., 30 Rockefeller Plaza, New York City, will relinquish the manufacturing plant of its Duramold Div. at Jamestown, N. Y., and discontinue operations there in the near future.

E. I. du Pont de Nemours & Co., Inc., Wilmington 98, Del., has announced price reductions for Lucite and polythene. Uncompounded polythene molding powder, with no coloring, is reduced from 53 to 50 cents a pound. Polythene molding powder, compounded in standard colors is reduced from 63 to 56 cents a pound. The cut in the price of acrylic resin molding powder averages 12 percent. In lots of 2000 lb. or more, clear transparent injection and extrusion acrylic molding powder is 70 cents a pound. Colored acrylic molding powders, for stock standard colors, are 75 cents a pound in lots of 5000 lb. or more.

The company has also announced that its foamed cellular cellulose acetate has been given the trademark Strux.

Springfield Moulders, Inc., with a plant located at Monson, Mass., near Springfield, has been formed by Victor E. Rosenlund, former sales engineer for Reed-Prentice Corp. and chief engineer of Rogers Plastic Corp. The firm will specialize in engineering and production sampling of new plastic applications, and injection molding with emphasis on economical production of short runs. Mr. Rosenlund's partner is Gilbert Stacy, former maintenance superintendent of Rogers Plastic Corp.

Rogers Associates, North Wilbraham, Mass., has been formed by Harry Rogers, formerly of Rogers Plastic Corp., to develop, sell and distribute plastic articles, and to provide the services of custom injection molding. The firm is a division of Plastic Turning Co., Inc., 511 Lancaster St., Leominster, Mass., injection molders and fabricators of Catalin and cast resins.

Plastics Industries Technical Institute of Los Angeles, Calif., with branches at New York and Chicago, has received the approval of the Veterans Administration for a home study course for veterans. It gives veterans the opportunity to improve their education and ability without interfering with their present activities. Honorably discharged veterans are eligible to apply for plastics training under the G. I. Bill and obtain this specialized course at home, at no cost to them.

An important feature of the Plastics Institute home study training is the complete working outfits of plastics materials which are an integral part of the course. The student is able to fabricate many interesting and valuable products which add to the practical value of his training.

Industry leaders are showing widespread interest in the home study training of veterans and are actively cooperating in the

program. Many are recommending that their employees obtain this through a home study course of instruction from the largest and oldest plastics training institution in the country. It is available at no cost to either the student or the employer under the provisions of the G. I. Bill. The value of the training will be appreciable to both the veteran and employer because of the increased knowledge and efficiency which the employee can bring to his job.

United States Plywood Corp., 55 W. 44th St., New York City, the distributor, introduced a new upholstery material, Blanchardized Vinylite, at the Store Modernization Show which opened Monday, July 7, at Grand Central Palace, New York City. This material is said to have the highest resistance to scuffing of any plastic manufactured for use as upholstery, wall coverings and counter tops, will not stain, is not affected by most solvents, mild acids and alkalis, and will resist heat up to 180°. It is produced and decorated by the Blanchard Deco Plastics, Inc., of New Jersey.

Midwest Molding & Mfg. Co., 319 N. Whipple St., Chicago, Ill., announces the acquisition of an additional plant at Gurnee, Ill., near Waukegan. Effective about September 1, general offices of the company will be located at 4630 W. Fullerton Ave., Chicago, Ill.

The Tarbonis Co., 4300 Euclid Ave., Cleveland 3, Ohio, manufactures a product, Tarbonis, that has been found most effective in providing therapeutic aid wherever cases of skin irritations and dermatitis occur due to the processing of plastics materials. Workers who are constantly exposed to phenol formaldehyde, unsaturated polyesters and other plastics often contract skin disturbances and find a need for alleviating the condition. Tarbonis, a long-established product, is a satisfactory protective agent for workers who continually contact the irritant, and a speedy cure for those who already suffer skin ailments.

Samples of the product are available to the plastics industry. The cream is odorless, greaseless and stainless, and will not soil hands, clothing or the work.

Plastics Molders Guild, Inc., 369 Lexington Ave., New York City, organized less than a year ago by seven injection molders in the metropolitan area, has increased its membership to 11. Through comparison of methods, techniques and types of plastics used, its members feel that better plastic products can be brought to the consumer at a fair price. The necessity for proper use of plastics is stressed. A Seal of Approval, denoting performance, integrity and economy has been developed by the Guild for use by its members.

Acryvin Corp. of America, 11-08 30th Ave., Astoria 2, Long Island, N. Y., has developed a quick setting, crystal clear or colored acrylic casting compound known as Acryvin. Because of quick setting property resin may be cast, it is said, at only a fraction of cost involved in casting other material. Supplied in liquid form, the shelf life of Acryvin varies from 3 to 24 months depending upon casting type and temperature of storage. Three types are available. Type A has high surface hardness, resistance to temperatures above that of boiling water and low



Action in a jiffy... with the Magic Carpet!

No need to hesitate about miles if you're after quality molded plastics that meet competitive prices and are *always* delivered as promised. Modern high speed "magic carpets" of planes . . . trains and telephones bring a General Industries man to you in a hurry carrying all the information and knowledge you'll want on *any* plastics molding job.

East, West, North and South we've been delivering, *on time*, for over a quarter of a century, molded plastics that give outstanding satisfaction. That's why we *still* retain most of our first customers. They're General Industries boosters from way back and we've kept them that way by never letting them down.

That same kind of plastics molding service is yours for the asking. For production that caters to closest tolerances and lustrous appearance at low cost and prompt delivery, put in a call for your General Industries representative. He'll climb aboard his modern magic carpet and bring you action in a jiffy.

THE GENERAL INDUSTRIES CO.
MOLDED PLASTICS PIONEERS
 Department PM • Elyria, Ohio

*Yes! We Mold Them
by the Thousands!*



PLASTIC TANK FLOAT *Lasts Indefinitely* WILL NOT CORRODE

This practical and attractive tank float is made from a material with a Phenol-Resin base. It is water-resisting. The threaded joint is carefully and securely cemented with a specially prepared compound. It will not corrode, dent or bend out of shape.

We have worked out this application successfully; if you have any other molded item that you need, write Now to

KUHN & JACOB MOLDING & TOOL CO.

1200 SOUTHARD STREET, TRENTON 8, N. J.

CONTACT
THE K & J
REPRESENTATIVE
NEAREST YOU

TELEPHONE-TRENTON 4-5391

S. C. Ullman, 55 W. 42nd St., New York, N. Y.
Telephone—Penn 6-0346

Wm. T. Wyler, Box 126, Stratford, Conn.
Telephone—Bridgeport 7-4293

moisture absorption. Its machineability is said to be comparable to wood turning and general wood working; optical properties are very good. It can be used in machinery and in the optical and medical field.

Type B, general utility type with physical and chemical properties approximating molded acrylics, has found use in wire insulation, television lenses and camera pots. Type C, the softest of the three, is said to be excellent for hand carving and decorating. Conventional molds as those for casting phenolics or acrylics may be used, or molds may be made from metals, plaster of Paris, glass, wood, paper, etc.

Monsanto Chemical Co., St. Louis 4, Mo., has announced that contracts for the reconstruction of part of the plant destroyed in the Texas City disaster April 16 have been let to the W. S. Bellows Co. of Houston, Tex., and the Leonard Construction Co. of Chicago, Ill. Initial contracts total more than \$6,000,000.

The company has also announced development of a successful line of clear and colored surface finishes for polystyrene. These lacquers are said to overcome the tendency of solvents to produce crazing. The lacquers are either clear or pigmented, resistant to oil and will protect the polystyrene.

The Board of Interference Examiners has upheld patents issued in 1939, 1940 and 1944 to Gits Molding Corp., 4600 W. Huron St., Chicago, Ill., relating to decorative articles formed of thermoplastic materials with a design embedded in them by recessing inwardly in the rear face to produce an illusionary effect. The characters formed by the recesses have the appearance of being embedded in the transparent body. The Board has upheld the Gits claim that they were first to conceive and first to reduce to practice the process and are, therefore, entitled to priority of invention.

J. J. Brown & Co., Inc., which specializes in roller embossing of vinyl films and polyethylene, has moved general offices from 675 Mt. Prospect Ave., Newark, N. J., to 2017 Lower Rd., Linden, N. J.

Textile Colors Div. of Interchemical Corp., Fair Lawn, N. J., has announced the development of an improved line of dyes known as Interchem acetate dyes for dyeing acetate rayon and nylon. Because they are colloidized during manufacture, these dyes turn to paste quickly and thoroughly in warm water, with no undispersed particles.

Pittsburgh Plate Glass Co., 632 Duquesne Way, Pittsburgh 22, Pa., has acquired the business of the Forbes Varnish Co. of Cleveland, Ohio, manufacturer of specialized production finishes. The new unit will continue operation as the Forbes Finishes Div. Finishes which will be turned out by this division comprise oleoresinous, phthalic alkyd, alkyd urea-melamine and nitrocellulose coatings.

The Fellows Gear Shaper Co., Springfield, Vt., has opened an office at Room 7706, Empire State Bldg., New York City.

Sorry!

On the coatings chart (No. 7) in Vol. III of the 1947 *Modern Plastics Encyclopedia*, Geon, a product of the B. F. Goodrich Chemical Co., has been given an incorrect code number. Under the listings for Vinyl Chloride Resins and Vinyl Chloride-Vinylidene Chloride Copolymers, the Goodrich code number (23) should replace (24) after Geon in the Trade Names column; and should also replace (24) in the Manufacturers column. Revised Coatings Charts are being prepared and complimentary copies of this amended chart will be furnished on request to subscribers who have already received their 1947 *Encyclopedias*.

(Please turn to next page)

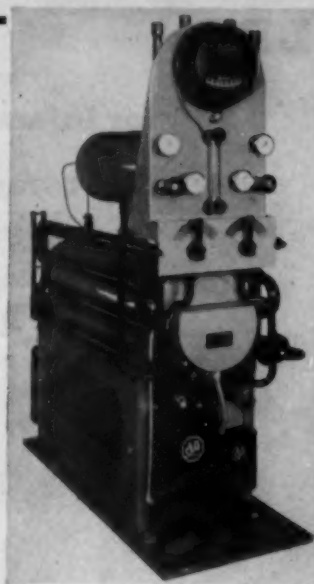
THE ROYLE TEMPERATURE CONTROL UNIT.

A compact, simply operated temperature control unit designed to supply the wide range of extruding temperatures required by the rapidly expanding number of extrudable compounds.

Chosen temperatures maintained—Two independently controlled circuits—Heat supplied or removed—Formed piping promotes cleanliness—Three standard sizes: 16KW, 32KW and 48KW—Compact.

The ROYLE TEMPERATURE CONTROL UNIT is also adaptable to industrial operations, other than extruding, in which accurate, predetermined and constantly maintained temperatures are a factor.

Write for Bulletin 443



JOHN ROYLE & SONS

ROYLE

PATERSON

N. J.

1880

PIONEERED THE CONTINUOUS EXTRUSION PROCESS IN

James Day (Machinery) Ltd.
London, England
REgent 2430

Home Office
E. B. Trout J. W. VanRiper
SHerwood 2-8262

Akron, Ohio
J. C. Clinefelter
JEfferson 3264

Los Angeles, Cal
H. M. Royal, Inc.
LOgan 3261

PATERSON 3, NEW JERSEY

HANG UP YOUR COAT
—and let's get to work

Keeping costs down...turning out quality work—that's the order of the day! Here at Ideal—we have the "know-how" and the facilities to do both!

Whether it's a clothes hanger or a buckle or a lipstick holder, our engineers and molders are trained to help you from drawing board to finished product.



Ideal

If you are looking for fine, accurate molding at economy costs, write or phone today.

MAIN OFFICE AND FACTORY
184-10 JAMAICA AVE.

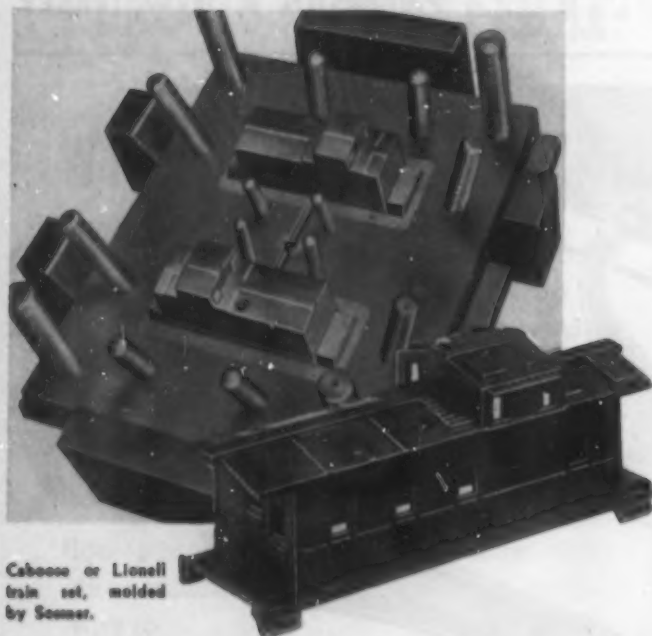
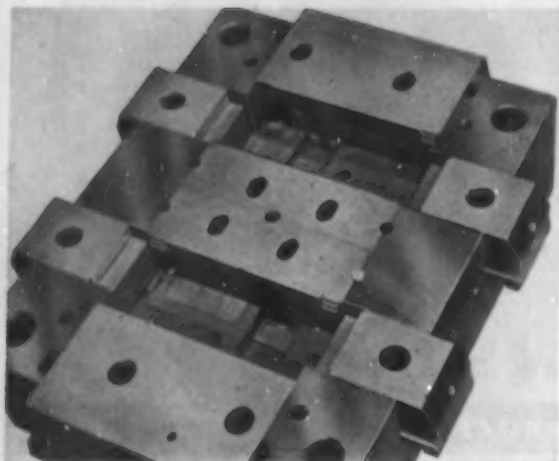
Jamaica, N. Y. • JAmica 3-7700

IDEAL PLASTICS CORP.

CHICAGO REPRESENTATIVE
STEEL MILL PRODUCTS CO.
176 W. Adams St. Chicago 111

COMPLETE MOLDS

for injection
and compression
molding



Caboose or Lionel
train set, molded
by Sossner.

SERVING THE PLASTICS INDUSTRY

We specialize exclusively in molds, hobs, hobbled cavities, and steel stamps. Send us your most intricate designs, your toughest mold making problems. Your design or blueprint will be reproduced to the finest precision details.

TAPS • HOBBS • DIES • STAMPS FOR PLASTICS

SOSSNER

161 GRAND STREET, NEW YORK 13

Haskelite Mfg. Corp., 701 Ann St., N.W., Grand Rapids, Mich., has received WAA approval for the purchase of a building built during the war to accommodate certain highly specialized types of laminated materials. The building, adjacent to the company's original Grand Rapids plant, is completely air conditioned with about 230,000 sq. ft. of manufacturing floor space. It will be used for the manufacture of Plymetl (a lightweight panel of metal and plywood) and laminated products.

Snyder Chemical Corp. and **F. H. Snyder Laboratories** have moved from 420 Boston Post Rd., Larchmont to Bethel, Conn.

Ace Plastic Novelty Co. has opened a new plant at 91-30 Van Wyck Blvd., Jamaica 1, N. Y.. This plant, occupying about 40,000 sq. ft. of space, combines injection molding with precision plastics fabricating operations. New equipment includes 8-oz. injection machines, additional automatic equipment for fabricating, as centerless grinding, drilling, an expanded toolroom.

Carbide & Carbon Chemicals Corp., 30 E. 42nd St., New York City, announces completion of a new plant at Texas City, Tex., for large scale production of ethylenediamine, diethylenetriamine, triethylenetetramine, tetraethylenepentamine and amino-ethylethanolamine. A highly reactive nature makes them useful in the synthesis of ion exchange resins, rubber accelerators, dyestuffs, photographic developers, synthetic waxes and resins, pharmaceuticals, corrosion inhibitors, insecticides.

Adhesive Products Corp., 1662 Boone Ave., Bronx 60, N. Y., has announced Griptex, a liquid rubber-plastic compound which makes rugs sproutproof, frayproof and skidproof. Applied by brush, spray gun, roller or doctor blade, Griptex forms a flexible film which anchors each individual tuft. It is said to be waterproof and can be used on hooked rugs, axministers, broadlooms, cotton-tufted, wool-tufted and braided rugs.

The company has also developed plastic tile cement which will hold plastic to concrete walls, painted surfaces and ceramic tiles. It is applied with a trowel and should be allowed to dry a few minutes before the plastic tile is placed in contact with the wall.

The Polymer Corp., Reading, Pa., has announced a price reduction of FMI nylon rods in diameters of 1 in. and below when purchased in quantities of 1000 ft. or more. Rods 1/8 in. in diameter now sell for 35 cents a foot while those 1 in. in diameter sell for \$2.15 a foot.

Personnel changes

It is with regret that we announce the death of **Michael Joseph Callahan**, manager of the Fabrics Div., Fabrics & Finishes Dept. of E. I. du Pont de Nemours & Co., Inc., on June 25.

Dr. Ernest B. Benger, one of the country's outstanding research directors and an authority on synthetic fibers and films, retired from E. I. du Pont de Nemours & Co., Inc., June 25, the 30th anniversary of his employment there as research chemist.

Arthur E. Marsan, **Miss Eleanor G. Sheridan**, **Miss Helen L. Robison** and **John Carlton Elliott** have been added to the staff of Bjorksten Research Laboratories, 185 N. Wabash Ave., Chicago, Ill.

Arthur L. Gardner, production manager of Monsanto Chemical Cos., Merrimac Div. at Boston, Mass., has been appointed assistant to the division general manager. **Frank Reese** has been named to lead the research mechanical development group at Springfield, Mass.

David C. Williams has been appointed assistant sales manager, Tenite Div., Tennessee Eastman Corp., with headquarters in Kingsport, Tenn. **C. H. Penning**, formerly of the Tenite Div.,

ORNAMENTATION OF METALS

Etched zinc name plate with three-color enamel fill-in. Blanked pierced and formed.



PLASTIC AND METAL COMBINATIONS

Highly decorated center button of clear plastic, set into plastic container with decorated chrome metal strips.



ORNAMENTAL PLASTICS

Clear plastic crest of three-dimensional casting, decorated enamel fill-in.



FUNCTIONAL PLASTICS

Plug-in thermo-setting plastic terminal with intricate metal inserts.

*Under one big roof
at AUTO-LITE*



The versatility of plastics, metals and plastic-metal combinations has opened unlimited possibility for the modern designer who is striving for precision and eye-catching appeal at the least possible cost.

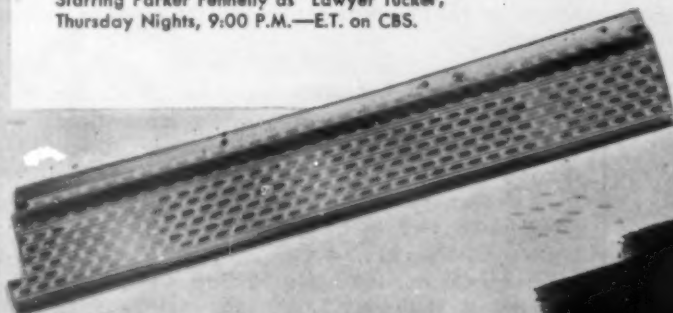
Under one big roof at Auto-Lite's Bay Manufacturing Division are the technical skills and the equipment which provide decorative and functional developments in both plastics and metals . . . These have proved themselves essential ingredients in the development and improvement of a wide variety of manufactured products.



THE ELECTRIC AUTO-LITE COMPANY

Bay Manufacturing Division
Detroit 2, Michigan Bay City, Michigan

Tune in the Auto-Lite Summer Show,
Starring Parker Fennelly as "Lawyer Tucker,"
Thursday Nights, 9:00 P.M.—E.T. on CBS.



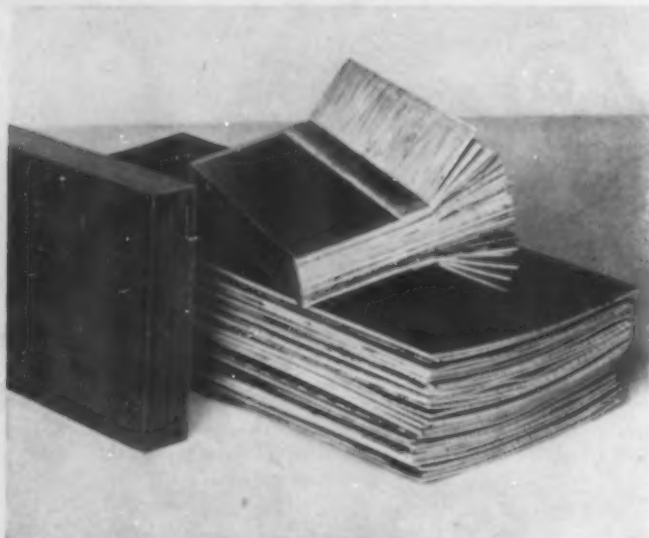
ROLLED AND FORMED METALS

Etched and polished aluminum scuff plate with enamel fill-in. Rolled, formed, pierced and trimmed.

Auto-Lite

FARLITE

Compreg



FARLITE COMPREG

Parallel or cross laminated hardwood veneers, impregnated with synthetic resins, are permanently fused under high heat and pressure to form Farlite Compreg. Pressing reduces plys to about $\frac{1}{2}$ their original thickness and creates a dense material of great strength, toughness and dimensional stability. It also has good electrical resistance and low moisture absorption. Available in five standard grades. Write today for full details.

GRADE 1808-M

Parallel laminated construction. Used principally for studs, bolts, nuts, bases, bearing plates, mechanical spacers, etc. Readily machined with same equipment used for cast iron.

GRADE 1716-B

Cross laminated construction. Used for bearing plates, mechanical spacers, control panels, etc. Since it is cross laminated, its physical properties are the same in either direction. Can be machined with same tools used for cast iron.

GRADE 1608-M

Made in either parallel or cross-laminated construction. Recommended for such items as utensil handles, novelties, and various furniture parts. Can be machined with woodworking equipment.

GRADE 1532-B

Cross-laminated construction only. Can be veneered to plywood for table tops, wainscoting, wall paneling, etc., or used for decorative applications. Can be machined with woodworking equipment.

GRADE 1524-M

Plastics Division

FARLEY & LOETSCHER MFG. CO.
DUBUQUE, IOWA

has become assistant sales manager of the Chemical Sales Div. F. R. Meredith is Tenite Office Supervisor at Kingsport.

We regret to announce the death on June 14 of John Boyes, senior New York special representative for the Cellulose Products Sales Div. of Eastman Kodak Co., Rochester, N. Y., at Summit, N. J., following a heart attack.

Reginald Rockwell was elected director of Hercules Powder Co., Wilmington, Del., at a recent board of directors meeting.

J. E. Derham, managing director of Moulded Products Australasia, Ltd., Sydney, Australia, is spending several weeks in the United States on his way to England. In both countries he will study new developments in plastics. He reports that the thermoplastic industry has made only a bare beginning in Australia.

George H. Redlin, formerly treasurer and controller of the Haskelite Mfg. Corp., 701 Ann St., N.W., Grand Rapids, Mich. was elected executive vice-president and controller at the May meeting of the board of directors. Paul Moore, president, was elected to the additional office of treasurer. The other principle executives remain unchanged with Victor S. Barnes, vice-president; E. W. Stoner, sales manager; William Verhey, factory manager; A. W. Faulconbridge, production manager; J. H. Jigelaar, director of research; J. A. Potchen, chief engineer and B. J. Werk, director of purchasing.

Meetings

The Society of The Plastics Industry Canada, Inc., has announced details of the Plastics Show to be held at the Canadian National Exhibition in Toronto, Ontario, from August 22 to September 6. The show will dramatize, through new product exhibits, new machinery developments and new fabricating techniques, the progress and potentials of plastics to the nation's industries. Some 24 companies have to date been assigned space in the Plastics Exhibit. They include: French Ivory Products, Ltd., Peckover's Ltd., Catalin Sales Co. of Canada, Synthetic Resins Ltd., M. Wintrob & Sons Ltd., T. W. Hand Fireworks Co. Ltd., Canadian Resins & Chemicals Ltd., Monsanto (Canada) Ltd., Hobbs Glass Ltd., Ontario Steel Products Co. Ltd., Duplate Canada Ltd., Canadian General Elec. Co. Ltd., Canadian Industries Ltd., Dow Chemical Canada Ltd., Percy Hermant Ltd., Haugh's Products Ltd., Electronic Devices Co. Ltd., Irvington Varnish & Insulator Co., Ltd., Somerville Ltd., Dulev Plastics Ltd., Rowe Packaging Co. Ltd.

The Society also announced that the next annual meeting will be held at Mount Royal Hotel in Montreal on February 16 and 17.

Plastics Engineers Association of New York elected the following officers for the 1947-48 season at a recent meeting at the Yale Club in New York City: Nicholas Klein, Injection Molding Corp., president; C. W. Marcellus, Majestic Molded Products, Inc., vice-president; Islyn Thomas, Thomas Engineering Co., program director; Stanley Sapery, treasurer; David Murray, Boonton Molding Co., secretary.

Besides officers, the board of directors includes: D. Gray Maxwell of Waterbury Companies, chairman; C. J. Groos, Boonton Molding Co.; Fred B. Stanley, Modern Plastics magazine; Winslow A. Ward III, American Cyanamid Co.; H. Jamison, H. Jamison Co.; Edward H. Miller, Celanese Plastics Corp. and John P. Lein, Universal Plastics Corp.

The Cleveland Section of S.P.E. met June 25 at General Electric Co.'s Nela Park, Cleveland, Ohio. Following dinner in the Nela Park cafeteria, members toured the lighting laboratories.

WE



TO DEVELOP NEW IDEAS

What are yours?

Our **AIM** is to transform new ideas into plastic products. Here is your progressive organization devoted to develop, mold and market new plastic products.

A modern plant, including presses of largest molding capacity, responsible engineering and production personnel, an efficient sales department, contribute to make each new **AIM** product a full success.

Inquiries from distributors—domestic and foreign—are invited.

Our specialties are housewares, utility articles and toys. Manufacturers of the SNACK-MASTER* tray and the EGG-CESSORY* egg holder.

*T. M. Reg. U. S. Pat. Off. *Patent Pending.



FACILITIES INCLUDE:

- Practical consultation
- Model Making
- Designing
- Engineering
- Mold Making
- Quantity Molding
- Assembling and Packaging
- Outlets for Domestic & Foreign Distribution



AMERICAN INJECTION MOLDERS, INC.

Plant and Office

42-38-40 27th Street,
Long Island City, N. Y.
Phone: Ironsides 6-6746



New York City Office

16 West 36th Street,
New York 18, N. Y.
Phone: Wisconsin 7-7761

SHEET
PLASTIC

... for a wide
range of uses

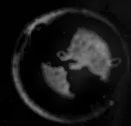
- These sheets come up to the most exacting specifications for quality, color, physical properties.
- Write for consultation on plastic sheet problems. No obligation.

- ★ STANDARD SIZE SHEETS 22" x 52"
- ★ THICKNESS from .005 to .100
- ★ SUPPLIED IN CELLULOSE ACETATE or BUTYRATE
- ★ TRANSPARENT ... clear or colored
- ★ OPAQUE ... in any specified colors

THE GREAT AMERICAN PLASTICS CO.

TELEPHONE: FITCHBURG 5300 FITCHBURG, MASSACHUSETTS TELETYPE: FITCHBURG 295

NEW YORK CITY SALES AGENCY: 27 WEST 20th STREET WATKINS 9-6968



MORE PRODUCTION

with a smaller investment

HERE'S help for molders of plastics and rubber who want to build up production with a minimum investment in equipment. The Hannifin Model No. L-208 is a compact, fast-operating, high quality air operated press especially designed for hot or cold compression molding of small parts in multiple cavity molds—YET IT IS AVAILABLE AT MODERATE COST. Hannifin's exclusive operating cycle, with easily regulated speed, makes it practical for one operator to handle several presses. Use ordinary shop air supply; add more presses when needed. This same press is also available for bench mounting—ask for information on Model No. L-209.

HANNIFIN

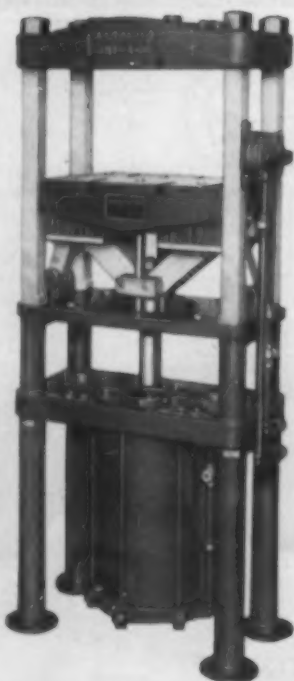
Model No. L-208 Air Operated Platen Press

● SPECIFICATIONS. Platen measures 17" x 14". Space between columns, 22". Daylight, platen down, 17½"; daylight, platen up, 10½".

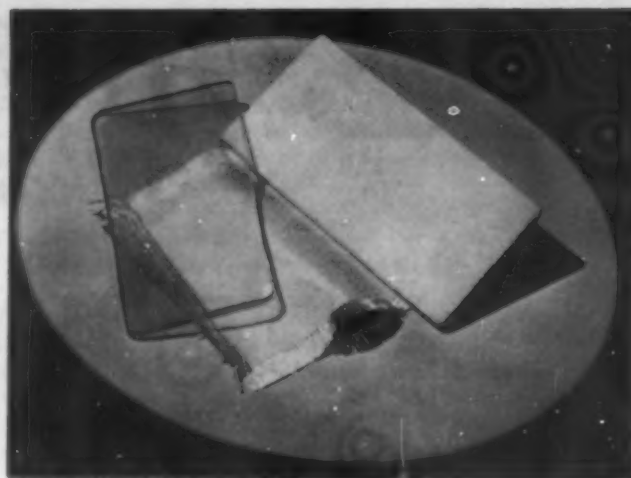
● CAPACITY. 15 tons with 80 lbs. line pressure; 18 tons with 100 lbs. air pressure.

● PRODUCTION SPEED. Advance speed six times the pressing speed. Advance stroke, 5½" at reduced pressure; power stroke, 1½" at full pressure.

● ORDERING. List price, \$750.00. Regular production insures good delivery schedules. For complete information see your local Hannifin representative or write HANNIFIN CORPORATION, 1101 So. Kilbourn Ave., Chicago 24, Ill.



PLATEN PRESSES



PHOTO, COURTESY VICTOR CHEMICAL WORKS

Two laminates on top of glass cloth are almost identical. Both have 10 layers of glass fabric in them. At left, new plastic has made layers of glass cloth transparent

New thermoset resin

A NEW thermosetting resin, V-Lite, can be added to the growing list of plastics. Announced by Victor Chemical Works, Board of Trade Bldg., Chicago, Ill., the substance, now in semi-works production, is a colorless liquid in its monomeric form but polymerizes to become a transparent, hard, strong resin.

Composition and polymerization

Chemically, the liquid is diallyl phenyl phosphonate. Polymerization of the material itself is speeded in the presence of 2 to 3 percent organic peroxide as a catalyst, dissolved in the original liquid. The hardest resins have been obtained using a mixture of 3 percent benzoyl peroxide plus 0.5 percent tertiary butyl perbenzoate as a catalyst mixture. Clear sections of resin, 1/8 to 1/4 in. thick can be made at atmospheric pressure by curing 2 1/2 to 3 hr. while raising the temperature from 85 to 130° C.

The liquid monomer copolymerizes with other monomers such as: methyl methacrylate, vinyl acetate, diallyl phthalate, diallyl succinate, diallyl oxalate and unsaturated alkyd resin mixtures. When mixed with other monomers, completely new sets of properties are found in the copolymers. For instance, it has been found that by mixing the new resin with methyl methacrylate the resulting material possesses a good flame resistance. The resin also has the effect of making methacrylate, as well as vinyl acetate, thermosetting instead of thermoplastic.

Properties of the resin

While all the properties of resulting copolymers have not yet been investigated, the outstanding characteristics noted thus far are: increase in flame resistance, increase in index of refraction and hardness of composition, and a decrease in solubility. Relative to the latter

Camera Evidence

of Another Plastics Job Well Done

When plastics entered this product-picture, costs came down! Professional in appearance and performance, the new Fed-Flash camera (shown here) evidences quality at low cost—through plastics!

The use of phenolic moldings for the five major components in the Fed-Flash assembly eliminated almost all finishing operations, while the plastic itself provides the necessary insulation for the electrical circuit in both body and flash attachment . . . camera-wise the unit is light-tight because it's molded right!

To provide production economies and reduce tooling costs, Consolidated designed and produced dies employing three different types of molding—plunger, transfer and compression. Precision mold construction and careful processing maintain the rigid tolerances required.

Here is camera evidence of a plastics job well done . . . evidence of the ability of Consolidated, through experience and sound knowledge to build another strong case for plastics, and to produce products which in their end-use serve . . . save . . . sell!

When plastics enter your product picture . . . for sound counsel on design and material selection—precision mold construction—dependable processing . . . look to Consolidated for production that is focused on quality. Inquiries invited!

Consolidated

MOLDED PRODUCTS Corporation

309 CHERRY STREET,
SCRANTON 2, PA.

"Your
Blueprint
in Plastic"



Fed-Flash Camera showing flash attachment mounted in place. Camera body, back cover, lens and flash housing and knob molded by Consolidated for Federal Manufacturing & Engineering Corp., Brooklyn, N. Y.

Branches: NEW YORK, 1790 Broadway • CHICAGO, 549 W. Randolph St. • DETROIT, 550 Maccabees Bldg. • CLEVELAND, 4614 Prospect Av. • BRIDGEPORT, 211 State Street.
PRODUCT DEVELOPMENT • MOLD DESIGN • MOLD CONSTRUCTION • PLUNGER MOLDING • TRANSFER MOLDING • INJECTION MOLDING • COMPRESSION MOLDING

air re
up product
markets on time.
enable you to price the
on a sound competitive basis.
Exclusively yours,
M. P. De Mattia
M. P. DE MATTIA ENG. CO.
BD:ac

When it comes to redesigning your products
making new molds or revamping production
planning you want expert engineering help.
Our staff-assisted in pioneering one of the first in-
jection molds and molding presses, and has partici-
pated in setting up many modern plants operating
successfully today. M. P. DE MATTIA collabo-
ration is available exclusively yours may
we serve you?

ASSOCIATED PAGE 1-6202, 1647

M. P. De Mattia Engineering Co.
GENERAL OFFICES: MAIN & FIELD ST., AVON, NEW JERSEY

Inquiries on die
cost estimates, ma-
terial selection and
any molding prob-
lem will receive
prompt attention;
please write on
company letter-
head.

NO MORE "GUESSING"

about the Selection of High Pressure Re-
ducing Valves for your Plastics Plant.
Simply specify

ATLAS Type "E"

shown at the right, and you will have a
valve that reduces pressures as high as
6,000 lb. per sq. in. without shock. Handles
water, oil, or air, with equal ease. Now
used by all of the leading plastics plants.



Yes, It's Guaranteed.

It is guaranteed by a concern that has been
making regulating valves exclusively for every
service for nearly a half century. Thus for instance in making the body
of Type "E" we use only the best forged steel. All internal metal parts
are wholly of stainless steel. A formed packing of special material superior
to leather is used which is immune to all fluids commonly used in hy-
draulic machinery. The pressure on the seat is balanced by a piston
with the result that variations in high initial pressure have little effect
on the reduced pressure. Ask for complete information.

For other ATLAS plastics plant products see the partial list in
our ad in the January 1947 issue of MODERN PLASTICS

ATLAS VALVE COMPANY
REGULATING VALVES FOR EVERY SERVICE

277 South Street, Newark 5, N. J.
Representatives in Principal Cities

characteristic it should be noted that the resin is insoluble in ether, acetone, benzene, butyl acetate, naphtha, alcohol, carbon tetrachloride, water, 5 percent hydrochloric acid solution and 5 percent caustic soda solution. It has proved stable when immersed in 30 percent sulfuric acid at 150° F. for more than 5 days.

Other properties of the resin, which is obtainable in the form of a thin liquid monomer or a pre-polymer syrup, include a specific gravity of 1.1 plus, and a Rockwell hardness (when in pure form) of M-95. In spite of hardness, the resin is said to have good machining properties and be easy on the tools. Storage does not present a problem since the monomer may be kept indefinitely and the pre-polymer for at least 6 weeks. Moisture and weather resistance are excellent. Index of refraction of pure Victor plastic is approximately 1.57, a figure higher than any but optical glass. Not only does this fact cause improvement in appearance of common plastics when copolymerized with them, but it makes possible the production of clear sheets of plastic with an adjusted index of refraction.

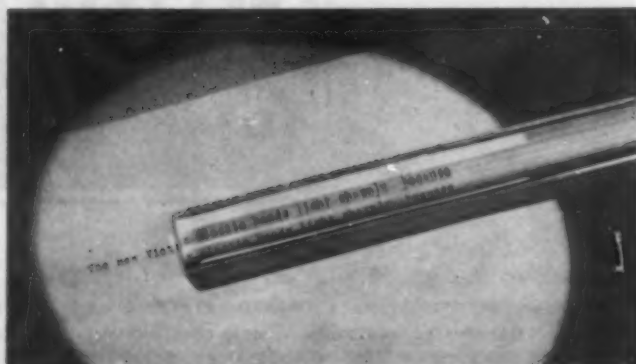
Probable applications

An official of the Victor Chemical Works had the following to say regarding the uses for the new resin:

"It is too early to predict in what manner our plastic will find widest application. The flame resistance suggests coating use for flammable decorations or veneers and as windows in passenger aircraft. The high index of refraction suggests transparent laminates strong enough to support themselves in outdoor illuminated display work and hail-proof greenhouse lights. The insolubility suggests use in chemical equipment and in storage battery cases. The hardness suggests copolymers for machined parts and for optical use. We think the greater possibilities for the resin will be found as a complement to other plastics."

Due to the excellent light refraction of the material it has recently been suggested that it be used with other materials as a substitute for glass. Especially notable in this respect is the fact that it can be matched to the index of refraction of glass cloth, permitting the production of glass cloth laminated structures with approximately 95 percent transparency.

Two images and a reflection show in the transparent rod of copolymer made with the new resin and vinyl acetate





HE'S AT THE RIGHT DOOR

The man who has a problem to be solved in PLASTIC MOLDING need go no further. This organization is equipped both in skill and experience to meet your needs.

A recent addition to our equipment, one of the largest injection molding machines in the country (the H-P-M-16 oz. machine for fast production of large area parts) enables us to meet your requirements for the injection molding of polystyrene and cellulose acetate materials.

Inquiries promptly handled.

MARTINDELL MOLDING COMPANY

North Olden at Sixth
TRENTON 2, NEW JERSEY
NEW YORK OFFICE—1182 BROADWAY

Plastics

PHENOLIC • UREA • CELLULOSE ACETATE MATERIALS

WE BUY IT...SELL IT...RE-WORK IT

PLASTIC SCRAP

H. MUEHLSTEIN & CO.
— INC. —

122 EAST 42nd STREET, NEW YORK 17, N. Y.

BRANCH OFFICES: Akron • Chicago • Boston • Los Angeles • Memphis

WAREHOUSES: Jersey City • Akron • Boston • Los Angeles • Memphis

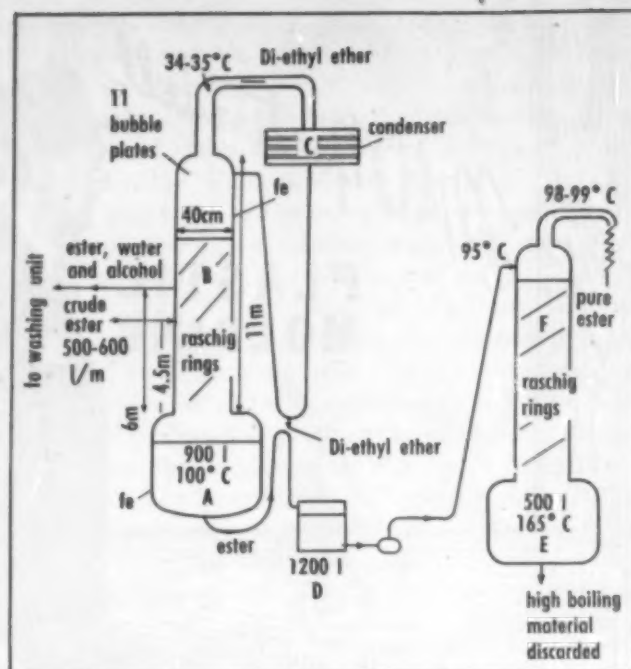
Acrylate polymers

(Continued from page 148) reaction vessel is paste-like and contains about 70 percent ammonium sulfate, water and some acrylic acid. This is run off continuously and discarded.

Acrylic acid solutions of higher concentration are not made because of difficulties caused by polymerization. The output per unit per day is 1800 kg. (calcd. as 100 percent acrylic acid). Two units are installed and are undamaged. The yield of acrylic acid is 85 to 90 percent based on cyanohydrin.

Butyl acrylate—Butyl acrylate is not made directly from ethylene cyanohydrin but from acrylic acid. A mixture of 2000 l. 50 percent acrylic acid, 1430 l. butanol, 2 l. 78 percent sulfuric acid and 500 gm. hydroquinone is made and fed at rate of 160 to 180 l. per hr. into the center of column *B* (Fig. 4) packed with Raschig rings. The evaporator *A* has a capacity of 1000 l. and is at a temperature of 115° C. A mixture of water and butanol is distilled, condensed, separated and the butanol returned to the system, entering about the middle of the column. The water layer containing about 7 percent butanol is distilled in separate apparatus.

The contents of the evaporator *A* are transferred through a pipe 15 cm. below the surface of the liquid to a second evaporator *C* heated at 138 to 140° C. The entering liquid in the second evaporator contains 75 to 80 percent butyl ester together with butanol and water. This is distilled, condensed, separated and the butyl ester with some butanol returned to the evaporator *C*. The column *D* has no packing. The crude ester is run off through a pipe 15 cm. below the surface of the liquid in the second evaporator *C*. The purity of the ester is 90 to 92 percent. If there is too much water in the ester, the temperature in the second evaporator cannot be maintained at 138 to 140° C. In order to



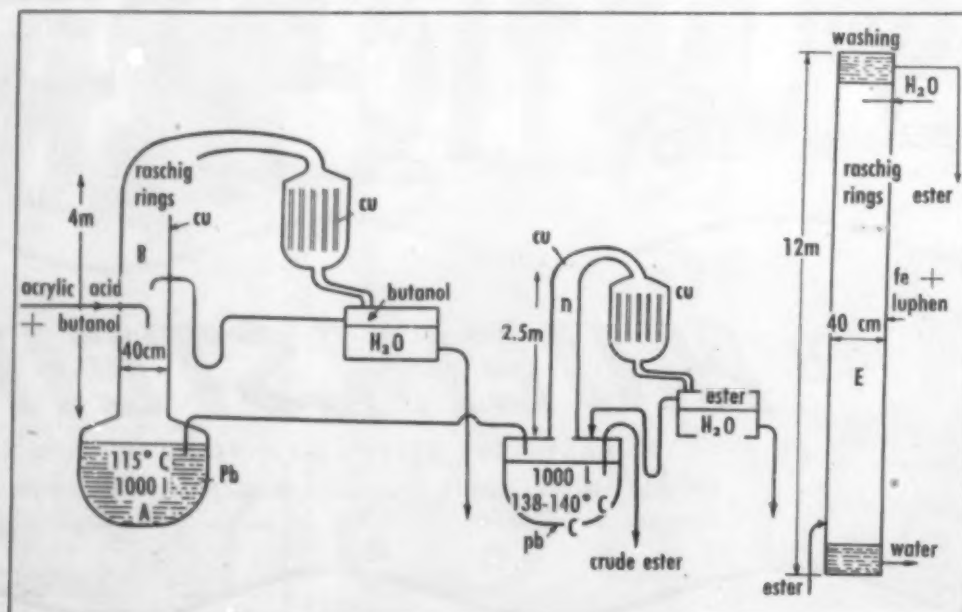
3—Set-up for purification of ethyl acrylate monomer

remedy this situation the inflow of reactants is reduced.

The crude ester is stored and then washed continuously with cold water. This is done in a tower *E* packed with Raschig rings. The ester enters near the bottom and the water near the top. One part of crude ester is treated with six to eight parts of water. Water containing butanol, acrylic acid and a little sulfuric acid is run off at the bottom. The butanol in the water is recovered by distillation. The ester from the top of the column is 94 to 95 percent pure.

It is finally purified by batch steam distillation in a plant similar to that used for the methyl ester (Fig. 2). The evaporator is charged and steam is blown over the surface to remove all air from the apparatus. The raw ester is heated to 80° C. and steam is blown through;

4—Equipment set-up for the production of butyl acrylate monomer





Needless to say, Franklin personnel are not accomplished pianists, perhaps, not even musically inclined. But they do have "trained hands", hands that are trained to produce the finest quality in plastic moldings. So if you have a problem involving custom molded plastic parts, consult Franklin. Their "trained hands" are at your service.



FRANKLIN PLASTICS DIVISION
Robinson Industries, Inc. - - FRANKLIN, PA.

MAXIMUM LUBRICATION... MINIMUM "STICKING" with Metasap Mold Lubricants



PHOTO COURTESY OF BOONTON MOLDING CO.

Metasap Stearates in your compound will keep plastics flowing without the need of excessive heat . . . prevent sticking to the molds . . . cut down heating time and costs.

Other Advantages of METASAP STEARATES

You'll also get these advantages from Metasap's better lubricating properties. Metasap Stearates permit operations at lower pressure. They penetrate to the surface of the compound to give a clean-cut finish. They help to lengthen die life and eliminate the need for buffing operations. If desired, Metasap Stearates may also be "dusted" on the molds.

The value of Metasap's improved internal lubrication—as an aid to better and more economical molding—is particularly revealed in plants requiring intricate mold designs and precise fabrication.

For complete information, write:

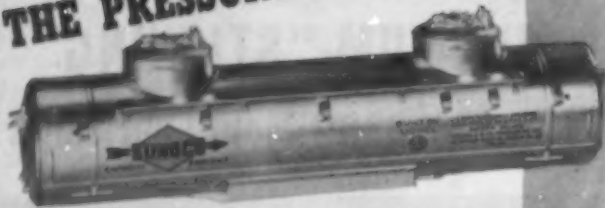
METASAP CHEMICAL COMPANY, HARRISON, N. J.
CHICAGO • BOSTON • RICHMOND, CALIF. • CEDARTOWN, GA.



Stearates

REG. U.S. PAT. OFF. of Aluminum • Calcium • Lead • Zinc

THE PRESSURE-PRINT PROCESS



for GLASS • PLASTICS • METAL

PRESSURE-PRINT is a special printing method we have developed for reproducing any number of colors on any shape and size of container. Good for glass, plastic or metal.

We can install this process in your plant and teach your operators how to reproduce in perfect registration any number of colors.

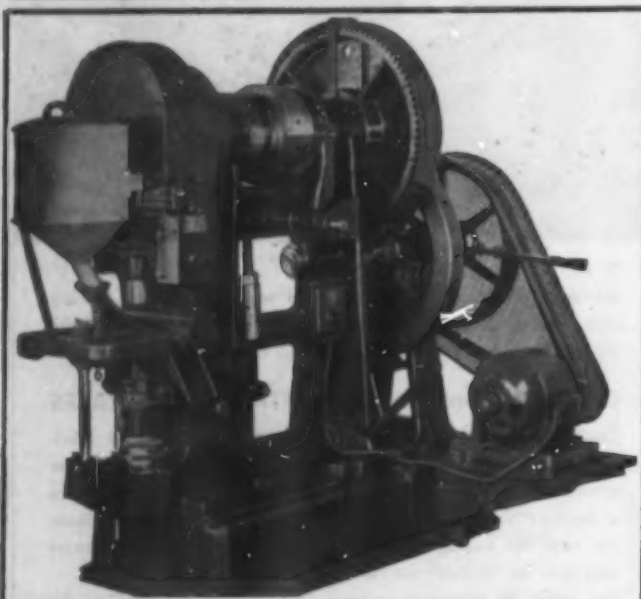
Or—if you would like to see how PRESSURE-PRINT will look on your container, we can do the work for you in our plant.

PRESSURE-PRINT process is impervious to oil, alcohol and water. Doesn't rub off, stays brilliant. Investigate PRESSURE-PRINT today.

Multi Color Graph

CORP.

Delaware 3-4443 397 Halladay St., Jersey City 4, N. J.



COLTON PREFORMER

THE new improved 5½ Tablet machine is the finest the market has to offer, solid steel frame, improved die fasteners and cam construction, vanadium steel plungers, etc. Write for catalogue.

ARTHUR COLTON CO.

2604 E. JEFFERSON AVE. • DETROIT 7, MICHIGAN

a mixture of water, butyl ester (80 percent) and butanol distills until the temperature reaches 93° C. The water is separated and the mixture of the 80 percent ester and butanol is united with the crude ester before washing. The ester distilled at 93 to 94.5° C. is run to a storage tank and added to the next batch. The fraction 94.5 to 96° C. is 99 percent pure butyl ester. Fraction 96 to 100° C. is collected and added to the next charge. The residue is discarded.

The normal yield of butyl acrylate is 85 to 88 percent, based on acrylic acid. There are two units for esterification, both undamaged. The output of crude ester was 85 tons per month. The two units for distillation can handle a total of 120 to 130 tons per month.

Acrylic polymers

Emulsion polymers—Emulsion polymerization is carried out batchwise in two vessels. The first is a premixing enameled tank which is jacketed for cooling water and is fitted with a paddle-type stirrer. Water and the emulsifying agent are run in followed by acrylic acid, if a mixed polymer containing the free acid is being made. The free acid is neutralized with sodium hydroxide to pH 7–8. Then the other monomers are added and finally the catalyst. The mixture must be kept cool to prevent the reaction starting.

The main reaction vessel is an enameled kettle fitted with a direct-drive paddle-type stirrer driven at 30 r.p.m. by a 3 kw. motor. A reflux condenser with aluminum tubes and return pipe is also attached. There is an inlet at the top for nitrogen and the dispersion is discharged from the bottom.

Fifteen to 20 percent of reaction mixture is added from the premixing tank, the stirrer started and the mixture heated to 70 to 80° C. When the reaction starts, noted by reflux (after ½ to ¾ hr.), the rest of the reaction mixture from the premixing tank is added gradually over a period of 2 to 3 hours. The reaction at this stage is not usually complete, but requires a further 1 to 1½ hr. at 80 to 90° C. The temperature should be kept within this range by heating or cooling as required. The catalyst used is 0.05 percent of potassium persulfate (K₂S₂O₈) or 0.5 percent of hydrogen peroxide (30 percent); the amount in both cases is calculated on the weight of monomer. The end of the polymerization is controlled chiefly by viscosity or by solids content. After polymerization there usually remains a trace of monomer which is removed by passing a stream of nitrogen over the surface for ½ hr. while temperature is 80 to 90° C. It is then cooled to 35° C.

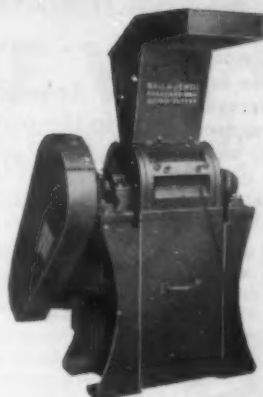
The following examples of batch formulations used in preparing emulsion polymers show general principles:

Acronal II D 40 percent verdichbar—The II indicates the ethyl ester, the D a dispersion (emulsion) polymer and the 40 percent the solids content; *verdichbar* means capable of being thickened with ammonia because of the addition of some acrylic acid monomer:

POSITIVE END SEALS

In usual dry cutting specially designed seals stop oil, grease or other foreign matter from entering cutting chamber. Keeps particles from entering bearings. In wet cutting of inflammables seals prevent water from leaving chamber to interfere with bearing lubricant. B & J Rotary Cutters are made in a wide range of sizes and types to meet any grinding requirement.

B & J
PLASTICS GRINDER
OUTSTANDING
FEATURES



**BALL BEARING
PILLOW BLOCK
DUST TIGHT**



BEARING

Machines have specially designed Outboard Anti-friction Bearings, completely independent of end castings. Either ball or roller—dependent on size machine.

BALL & JEWELL, Inc.

20 FRANKLIN STREET

BROOKLYN, N. Y.

Since 1895, Manufacturers of Patent Rotary Cutters

CHICAGO: Neff, Kohlbusch & Bissell Inc. DETROIT: J. C. Austerberry's Sons. LOS ANGELES: Moore Machinery Co. LOS ANGELES AND SAN FRANCISCO: Machinery Sales Co. NEW ENGLAND: Standard Tool Co., Leominster, Mass. ATLANTA, GA.: George L. Berry. ST. LOUIS: Larrimore Sales Co. CLEVELAND 22, OHIO: L. F. Willmott, 3701 Latimore Rd. SEATTLE 4, WASHINGTON: Olympic Supply Co. KANSAS CITY, KANS.: Fluid Air Engineering Co. MINNEAPOLIS, MINN.: Winston Henning Co., Chas. W. Stone. CINCINNATI, OHIO: Index Machinery Corp. DALLAS, TEXAS: Perry Machinery Corp. AUSTRALIA AND NEW ZEALAND: Scott & Holladay (Asia) Pty. Ltd. NEW YORK 16, N. Y.: Foreign Distributors: Omni Products Corp., 40 E. 34th St. STOCKHOLM, SWEDEN: Ingenjorsfirman Teknova. CANADA: Williams & Wilson, Ltd., Toronto & Montreal. HAWAIIAN ISLANDS: Hawaiian Sales Service, P. O. Box 3498, Honolulu 11, T. H.

Skilled Hands . . . Since 1890

**MANUFACTURING
PLASTIC
and
METAL
PRODUCTS**

- LAMINATES
- FABRICATION
- INJECTION MOLDING
- ENGINEERING DEVELOPMENT
- BUILDING MACHINERY, DIES, MOLDS

**THE VOGES
MANUFACTURING
COMPANY INC.**



OZONE PARK
L. I. 17, NEW YORK

TELEPHONE: VI-7-3100

Send Us Your Problems Today!

For PANTOGRAPHIC ENGRAVING ON PLASTICS



Model UE-3.
Also lighter
models UE, UE-2.

Panto Engravers, rugged and precision-built, for accurate and clean-cut engraving on plastic and metal products. **Depth Regulator**, available with all models, produces a uniform depth of engraving on irregular and curved surfaces. **Forming Guide**, on the UE-3 only, for use on curved, spherical, and beveled surfaces.

Engraving cutters, master copy type, fixtures, and endless round belts, for all types of engraving, die and mold-cutting machines

MODEL CG GRINDER
for quick and accurate
sharpening of engraving
and routing cutters.

» Catalog
on request



H. P. PREIS ENGRAVING MACHINE COMPANY
1402 SUMMIT STREET NEWARK 4, NEW JERSEY

PANTO MARKING EQUIPMENT



EAGLE TOOL & MACHINE CO.

OFFICE AND FACTORY:

37-39 FREEMAN ST., NEWARK 5, N. J.

TELEPHONES: MARKET 3-1572-73

It's simply a matter of addition:

MODERN EQUIPMENT
+ **SOUND ENGINEERING**
+ **28 YEARS PRACTICAL EXPERIENCE**
= **SUPERIOR MOLDS**

We are familiar with all the latest methods of plastic fabrication and their mold requirements. Consult us for estimates on molds or problems concerning their design.

PLASTIC MOLDS
INJECTION · COMPRESSION · TRANSFER

This product is also known as Corialgrund A in the leather trade. Its K-value is 80 to 85.

1320 kg.	Ethyl acrylate
95 kg.	Acrylic acid
30 kg.	Amphoseife 18 (sodium oxyoctadecane sulfonate; amount based on solids; bought as 14 percent solution)
0.5 percent	Hydrogen peroxide (calculated on monomers)
1800 kg.	Water

Acronal 500 D 50 percent—This product is also sold in the textile trade as Appretan GI for use in treating fabrics prior to waterproofing. K-value is about 80.

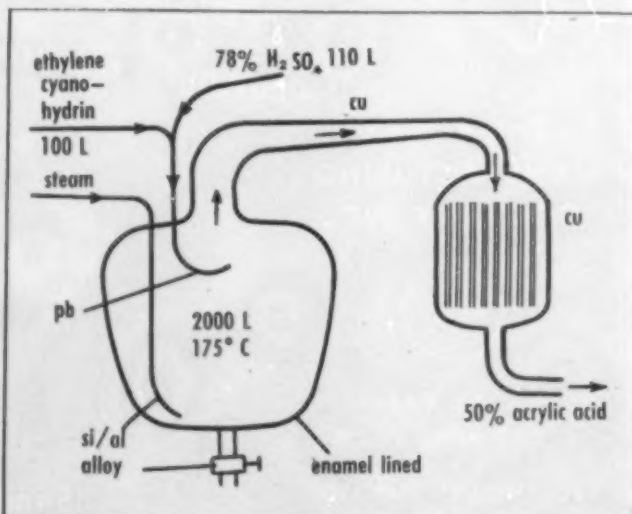
1375 kg.	Butyl acrylate
1375 kg.	Vinyl acetate
50 kg.	Acrylic acid
25 kg.	Amphoseife 18
25 kg.	Emulphor 0 (made from 20 mols ethylene oxide and 1 mol octadecyl alcohol or C ₁₅ -C ₁₇ fatty alcohols (Fischer-Tropsch))
0.05 percent	Potassium persulfate (based on monomers)
2500 kg.	Water

Acronal 450 D 40 percent—

1450 kg.	Ethyl acrylate
440 kg.	Vinyl isobutyl ether
264 kg.	Styrene
44 kg.	Acrylic acid
44 kg.	Amphoseife 18 (100 percent)
10 kg.	Potassium persulfate (note exceptionally large proportion)
2700 kg.	Water

Solution polymers—The solution polymerization process is similar to that described for emulsion polymerization. A more powerful motor (20 to 25 kw.) is used and the stirrer is driven at 20 to 30 r.p.m. The solvents commonly worked with are ethyl acetate, benzene, benzine and toluene. The catalyst employed is 0.1 to 0.5 percent of benzoyl peroxide, based on

5—Production of acrylic acid monomer



Cumberland Machines for the Plastics Industry



← NEW!
**CUMBERLAND SLITTING
 AND MANGLING MACHINE**
NEW! →



**CUMBERLAND ROTARY
 CHOPPING MACHINE**

PROMPT DELIVERY



Just added to the well known line of Cumberland Plastics Granulating Machines is the Slitting & Mangling Machine shown above, which takes sheet or slab plastic material up to 18" wide and reduces it to pellet size for direct use in a molding machine, or prepares it for subsequent reduction in Cumberland Granulating Machines. Also new is the Rotary Chopping Machine with standard capacity up to 14" width (wider machines built special), used to reduce extrusion machine scrap, to reduce side shear scrap from calendering rolls, and to prepare materials from compounding mills for final reduction in our Granulating Machines.

REQUEST CATALOGS

Slitting & Mangling Machine
 Rotary Chopping Machine
 Plastics Granulating Machines

No. 300
 No. 400
 No. 200

CUMBERLAND ENGINEERING COMPANY, INC.

Dept. A Box 216, Providence, Rhode Island

PLASTICS

PRECISION MOLDED IN LARGE VOLUME

at DICKTEN & MASCH

In our new modern plant, one of the most up-to-date in the midwest, your requirements are given special attention by experts trained to exactness in the most difficult molding.

WE DESIGN AND FABRICATE YOUR MOLDS

Your product is engineered from start to finish by an able, experienced organization. Skilled men design and completely fabricate your molds.

For plastic molding in all compression and transfer molding materials, write, wire, or call us — today!

AT YOUR SERVICE



DICKTEN & MASCH mfg. Co.

Plastic Molding

903 E. VIENNA AVE., MILWAUKEE 12, WIS. EDGEWOOD 4298

NEED SPEED

IN CUSTOM MOLDING?

Here's Why You Can Get It From Us --

NO RAW MATERIAL SHORTAGE --

we manufacture our own phenolic thermosetting molding compounds.

NO DELAYS IN MOLD DESIGN AND CONSTRUCTION

we have complete facilities to produce molds of the most intricate character. Have hobbing facilities and duplicating equipment.

NO PRODUCTION BOTTLENECKS --

completely equipped modern plant utilizes latest methods. Range in presses from 15 to 400 tons. We also employ electronic preheating.



Phenolic distributor cap produced from molds and molding compounds produced in our own plant.

Precision molds and precision molded parts are available to you without the usual delays encountered in design and raw material shortages.



 **LaPointe-Plascomold Corporation**
UNIONVILLE • CONNECTICUT

monomer. The K-value is controlled in some cases by the addition of aldehydes to promote termination reaction. The aldehydes used are propyl and butyl in amounts from 0.008 to 0.015 percent of monomer. Acetaldehyde is not used because of handling difficulties. The K-value varies from 45 up to 70. Solid contents are 25 to 40 percent for high viscosity polymers and 50 to 60 percent for low viscosity polymers. Mixed polymers containing acrylic acid are not made by solution polymerization, as ester interchange occurs and the free acrylic acid polymerizes in solution, giving incompatible polymers.

Aqueous solution polymers—These are prepared by saponifying emulsion polymers with potassium hydroxide, sodium hydroxide or ammonia. The products are sold under the trade name Latekol. The reaction is carried out in a kneader made of V2A or V4A stainless steel. The mixer is closed and fitted with a condenser. The dispersion of emulsion polymer to be used is charged to the kneader and part of the saponifying agent is added (5 to 10 percent excess of a 50 percent aqueous sodium or potassium hydroxide, or up to 20 percent excess of 25 percent aqueous ammonia). The reaction usually starts spontaneously and the products heat up to 80 to 90° C. by exothermic heat. The remainder of the saponifying agent is added and the reaction is continued until an opalescent solution is obtained. This process requires 8 to 12 hr. for a batch of 3 to 4 tons. During the reaction the mixture becomes very viscous in the intermediate stages. When reaction is complete, the mass is neutralized with sulfuric acid to pH 8-9. The liberated alcohols are recovered.

Solid polymers—Acrylic esters cannot be conveniently polymerized by block polymerization owing to the violence of the exothermic reaction. Solid products are therefore made from dispersions by adding electrolytes, filtering off the polymer, washing, rolling and drying. The process is done in an open vessel fitted with a stirrer. This vessel is charged with 1500 liters of a 0.5 to 1.0 percent solution of the electrolyte. The electrolytes used are the chlorides of magnesium, calcium and aluminum; of these, aluminum chloride is preferred. Formic acid is used when the polymers are required for special purposes where the presence of an electrolyte would be objectionable. The formic acid is decomposed or evaporated during subsequent processing. The electrolyte solution is stirred and 1500 liters of a 25 percent dispersion are added slowly so that the temperature does not rise above 25° C. The polymer precipitates in flocculates of about 1 cm. These are filtered and passed to washing rolls. One of the washing rolls is fluted; the other is plain. The material runs on the plain roll and there is a stream of water running between the rolls. By the action of the fluted rolls, efficient washing is obtained. The material is finally cut off and sheeted in plain rolls. It is then cut into strips and dried in a vacuum oven at temperatures up to 70° C. Sheets of isobutyl acrylate polymer are dusted with talc to prevent sticking during drying.

VAN DORN

1 OZ. INJECTION PRESS

Makes Money

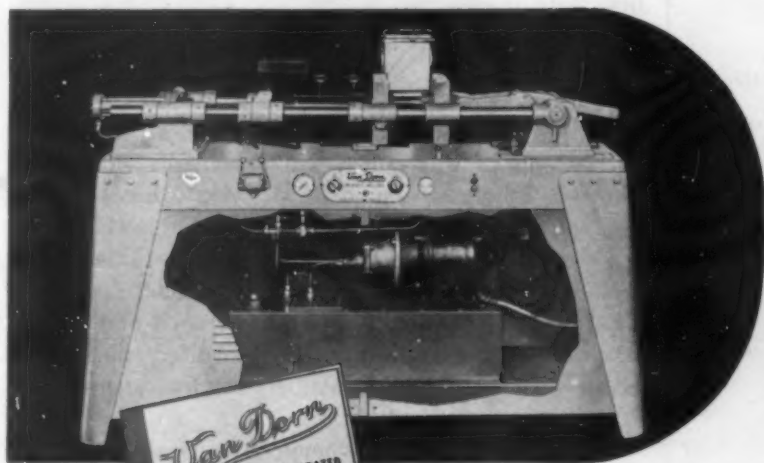
WITH PROFITABLE PRODUCTION

Hundreds of different plastic products—ranging from parts for home appliances, electrical equipment and industrial machines, to novelties, jewelry and toys—are profitably molded on the Van Dorn H-200 Press.

Saves Money

WITH LOW ORIGINAL COST AND ECONOMICAL PRODUCTION

The unusually low first cost of the Van Dorn Press—plus the advantages of lower mold cost, quick set-up time, easy operation and efficient production—is real assurance of worth-while savings.



WRITE FOR BULLETIN
which illustrates and describes
the Model H-200 Van Dorn
Plastics Injection Press and its
many applications.

A PRACTICAL PRESS FOR TODAY'S REQUIREMENTS

Buy a Van Dorn Press . . . and save the difference! Requires no big outlay of capital investment . . . but delivers flexibility and productive capacity that meets today's competitive market conditions.

Electrically powered and hydraulically operated for simple, economical, fast operation. Today, more than ever, it will pay you to consider a Van Dorn Press.

ASK US FOR THE FULL FACTS!

THE VAN DORN IRON WORKS CO.

2687 EAST 79TH STREET

CLEVELAND 4, OHIO

in PLASTICS
you've got
to KNOW this
Scrap
business!



We can offer reprocessed plastic materials which, for certain purposes, may be used to lower your production costs without lowering your quality.

If you wish to re-use your own scrap we can grind, magnetize, separate and rework it and return it to you clean and ready for use.

On the other hand, we will buy your thermoplastic scrap, rejected molded pieces and obsolete molding powder.

IT WILL PAY YOU TO CONSULT US.

CELLULOSE ACETATE • POLYSTYRENE • METHYL METHACRYLATE

A. BAMBERGER

CORPORATION

44 HEWES STREET, BROOKLYN 11, N. Y.

PHONE EVERGREEN 7-3887 • CABLE CHEMPROD BROOKLYN

CELLULOSE ACETO-BUTYRATE • POLYVINYL RESINS, ETC

Effect of pH

(Continued from page 146) of the resin varies with the formaldehyde ratio rather than with the amount of the catalyst.

Reactivity of resorcinol resins

Reactivity of resorcinol resins of varying pH with formaldehyde was determined by preparing 100 grams of 50 percent aqueous resin solution for each sample. Each was cooled to room temperature (25° C.) and to each was added 25 grams of commercial 37 percent formaldehyde. The time of addition was noted and each mixture was observed carefully until it had formed a hard gel which was used to indicate the substantial completion of the reaction. The results of these determinations are shown in Table III.

A method of separating those extremely reactive resins in the lower and neutral pH ranges was needed. For this purpose resin solutions were prepared using 50 grams of resin with 50 grams of solution containing: 1) 33 $\frac{1}{3}$ percent alcohol and 66 $\frac{2}{3}$ percent water, 2) 66 $\frac{2}{3}$ percent alcohol and 33 $\frac{1}{3}$ percent water, and 3) 100 percent alcohol. After the solutions had been cooled to room temperature the 25 gram portion of 37 percent formaldehyde solution was added to each and the time to gel was observed. These results are presented in Table IV.

It was desired to have a faster method of evaluating the slow resins and accordingly they were tested on a hot plate maintained at 140° F. The test was performed by taking the desired resin and formaldehyde mixture and removing the amount necessary to cover a $\frac{1}{2}$ -in. wide spatula blade about 1 in. up on the blade. This was transferred to the hot plate and left undisturbed. Cure was considered satisfactory when the film was tough and could be stripped from the plate. The results of these tests are shown in Table III.

Following the completion of these studies other tests were made wherein the resin used had no catalyst whatsoever. The solutions were prepared and the pH adjusted by the addition of concentrated solutions of alkali or acid. The formaldehyde was then added

Table III.—Reactivity of Aqueous Resorcinol Resin Solutions of Varying pH

(Ratio of formaldehyde to resorcinol in the resin was 0.67:1.0)

pH of 50% aqueous solution	Gel time of 100 gm. of 50% aqueous solution with 25 gm. of 37% formaldehyde added	
	Unheated	Heated to 140° F.
1.92	5 min.	...
2.96	>30 hr.	20 min.
5.11	7 hr.	10 min.
5.78	4 $\frac{1}{2}$ hr.	8 $\frac{1}{2}$ min.
6.23	2 $\frac{1}{4}$ hr.	6 $\frac{1}{2}$ min.
6.51	1 hr.	4 $\frac{1}{2}$ min.
6.65	50 min.	4 min.
6.90	40 min.	3 $\frac{1}{2}$ min.
7.04	24 min.	3 min.
7.11	20 min.	2 $\frac{3}{4}$ min.

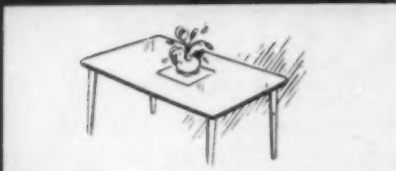
SAVE THE WASTE OF WEIGHT...

When a surface material is required for tabletops, wall surfaces, furniture surfaces, you can cut your costs without any sacrifice in quality or appearance by using Plyon. For Plyon is the versatile thermosetting laminate that is available in thicknesses of 1/16" or 1/32"

A thin material makes no sacrifice in the quality of the surface and Plyon makes it possible to achieve all the effects of unusual patterns, color combinations, wood grain effects, etc.

Plyon does not chip, peel, or lose its brilliant lustrous appearance. It resists alcohol, soaps and mild abrasives.

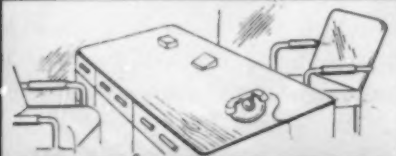
Investigate the savings of what can be enjoyed with Plyon—the thinner surface material.



Tabletops can be produced at a lower cost without sacrificing quality or appearance. Tops are washable, waterproof, resist most acids and solvents.



Wall surfaces, display panels, folding screens, moldings and luggage can all utilize the strength, surface hardness and low cost of Plyon.



Desk tops that retain the attractiveness of wood grains and eliminate the need for auxiliary surface material are available with Plyon. Pastel shades, fabric patterns, solid colors, etc., can be had with Plyon.

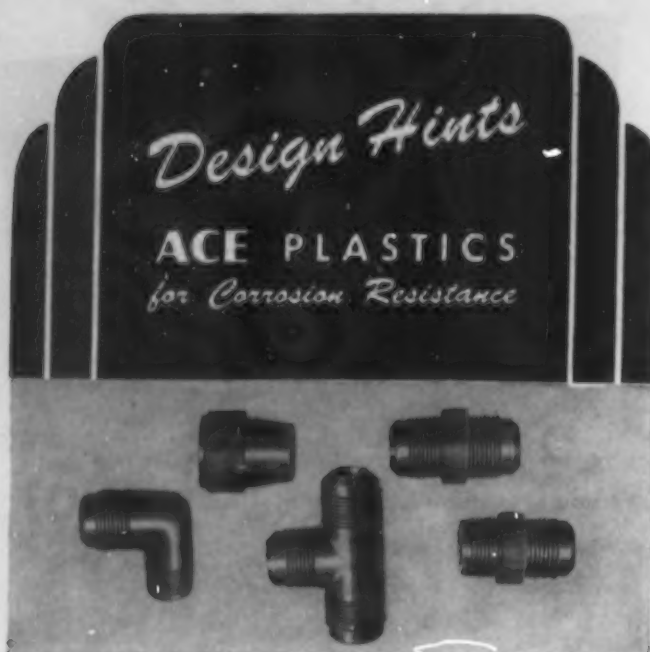
Swedlow PLASTICS CO.

5527-33 District Blvd. • Los Angeles 22, Calif.

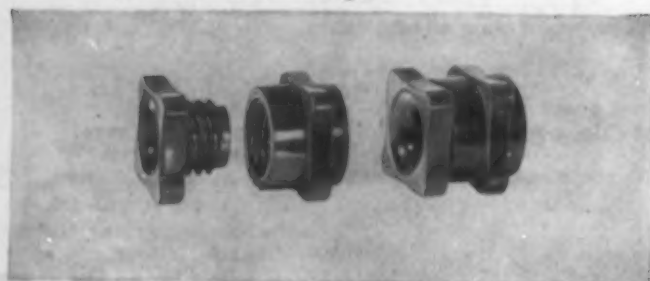
West Coast Distributors:

FIR-TEX OF SOUTHERN CALIFORNIA, 812 EAST 59th STREET, LOS ANGELES, CALIFORNIA Telephone: ADams 8101

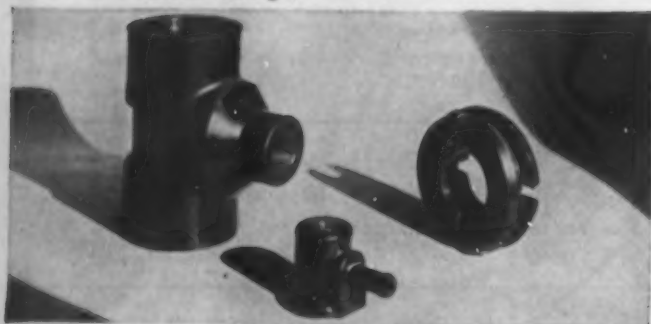
AUGUST • 1947 239



Maximum alkali resistance, and toughness at low temperatures were required, so ACE recommended polyethylene for these ACE-molded fittings.



Rayon spinnerette couplings, designed and molded by ACE of Saran, last longer and assemble quicker than the previous costly metal fittings.



Saran was recommended for these three typical ACE-molded parts. ACE puts 75 years of corrosion experience behind their recommendations.

IF IT'S MOLDED OR EXTRUDED

Specify ACE

and send your drawings to

AMERICAN HARD RUBBER COMPANY

11 MERCER STREET, NEW YORK 13, N. Y.

Table IV.—Reactivity of Alcoholic Solutions of Resorcinol Resin

(Ratio of formaldehyde to resorcinol in the resin was 0.67:1.0)

pH of 50% aqueous solution	Gel time of 100 gm. of 50% resin solution with 2.5 gm. of 37 percent formaldehyde added		
	$\frac{1}{2}$ alcohol $\frac{2}{3}$ water	$\frac{2}{3}$ alcohol $\frac{1}{3}$ water	100% alcohol
	hr.	hr.	hr.
2.96	>30	>30	>30
5.11	>30	>30	>30
5.78	>30	>30	>30
6.23	3	3 $\frac{1}{2}$	4 $\frac{1}{4}$
6.51	2	2 $\frac{1}{2}$	3
6.65	1 $\frac{1}{2}$	2	2 $\frac{1}{2}$
6.90	1 $\frac{1}{4}$	1 $\frac{1}{2}$	1 $\frac{3}{4}$
7.04	$\frac{3}{4}$	1 $\frac{1}{4}$	1 $\frac{3}{4}$
7.11	$\frac{1}{2}$	$\frac{3}{4}$	1

and the time to gel noted. These results correlated with the others so well that they are not given in this article.

The acid pH range has been discussed only in a cursory manner. This was largely because extensive study had shown the damage done to cellulosic fibers by resin adhesives of strongly acid character, which directed the study into the more neutral compounds.

It is interesting to note that the ultimate commercial product⁸ which was developed, and which is now so well exemplified in the commercial room temperature setting resorcinol resins, had a pH in reaction mixture of almost precisely 7.0, varying in laboratory control tests from 6.85 to 7.08. A number of new patents have recently been issued on resorcinol resins.^{9, 10, 11, 12}

⁸ "Resorcinol resins and adhesives," by P. H. Rhodes, MODERN PLASTICS 22, 160 (Dec. 1944).

⁹ U. S. patent 2,414,414—P. H. Rhodes (Pennsylvania Coal Products Co.).

¹⁰ U. S. patent 2,414,415—P. H. Rhodes (Pennsylvania Coal Products Co.).

¹¹ U. S. patent 2,414,416—P. H. Rhodes (Pennsylvania Coal Products Co.).

¹² U. S. patent 2,414,417—Arthur J. Norton (the Pennsylvania Coal Products Co.).

TO STIMULATE CONSTRUCTIVE AND original thinking among young plastics engineers, The Society of Plastics Engineers, Inc., has inaugurated an annual contest. Original papers on subjects of importance to the plastics industry will be solicited in each of the sections. Local section committees will judge the local papers and award a local prize. Prize papers from each of the sections will go to a National Committee which will select the three best papers. National winners will be presented at S.P.E. annual meeting each year and receive a suitable National Plastics Award.

Contestants must be less than 30 years old. The papers must not exceed 5000 words exclusive of diagrams and photographs. They must not be released for publication prior to release by S.P.E. For further details contact J. H. Du Bois, Shaw Insulator Co., 160 Coit St., Irvington, N. J.



complete

to make complete; make whole or
entire; make up the full number or
amount of; bring to an end, or finish;
make perfect; fulfil or accomplish.

★ Columbia's complete facilities
for molding and processing plastic products
assure rigid control
from conception to completion.

Columbia

COLUMBIA PROTEKOSITE CO., INC. • CARLSTADT, N. J.

New York Display Office: Empire State Building

MOLDERS AND MANUFACTURERS OF PLASTIC PRODUCTS

All classified advertising payable in advance of publication. Minimum, \$5.00 (up to 60 words); in border, \$10.00 per inch

Classified Advertisements

For further information address Classified Advertising Dept., MODERN PLASTICS 122 East 42nd St., New York 17, N. Y.

FOR SALE

Hydro Pneumatic Accumulator, 13 Gal. 3500#. 25 Ton "C" Frame Type. High Speed Self Contained Hyd. Press—300 ton New Hobbing Press with Pump—Racine Pumps, Boosters, Valves, Logan Pumps, Valves. Self Contained.—200 H.P. 78 Gal. 3000# Pump. 200 H.P. 200 Gal. 1500# Pump. 18" x 15" Accumulator 1510#.—15" x 11" Acc. 400-2000#. 6" x 9" Accumulator—2000#. 300 Ton Press 20" Ram, 8" Stroke, 24" x 20" Platen. 500 Ton—1000 Ton Hobbing Press.—Hole Shaw Variable Pressure 33 GPM 2500#.—Vickers Oil Pumps 17 GPM 500 to 1000#. Elmes Hore. 4 Plunger 6 1/2 Gals. 5000#.—Stillman 12 x 12" Laboratory Presses. Aaron Machinery Co., 45 Crushy St., NYC.

DO YOU NEED a Hydraulic Press for Compression Molding, Transfer Molding, Laminating, Forming, Bending, and Hobbing? Many sizes hydraulic presses and pumping units available. New motors from 2 to 7 1/2 H.P., 220 volts, 3 phase. Whatever it may be, if it is hydraulic, see Sal-Press Company, 388 Warren Street, Brooklyn, N. Y.

CHEMIST WANTED

Man well grounded in Organic Chemistry. Experienced in the formulation of resinous adhesives and coatings. Work to cover research and operations. Experienced in the laminating of acetates and pre-formed film to paper and fabrics desired. State fully qualification, age and salary desired. Good opportunity for right man. Work will be under the supervision of top management. Reply Box C370, Modern Plastics.

FOR SALE—1—Watson Stillman Hydro-Pneumatic High and Low Pressure System, complete with pumps, tanks, boilers, etc., for 3000# operation. 2—Baker Perkins 100 gallon Plastic Mixers. 1—13" x 12" Press 7" Ram. Steel Heated Platens and Hand Pump attached. 1—24" x 24" Adamson, 10" ram, 2-opening Hydraulic Press. 1—24" x 24" Farrell, 10" ram, 2-opening Hydraulic Press. 1—30" x 30" D&H, 2-open, steel heated Platens 12" ram. 1—La Pointe Hydraulic Pumps, 130 G.P.M.—2000 lb. pressure direct motor driven to 125 HP AC motors. 1—French Oil Hydropneumatic Accumulator. 1—14" x 24" Press, 9" ram. 6—Hydraulic Presses, 20" x 20", 12" x 14". Dry Powder Mixers, Pulverizers, Grinders, etc. Send for complete list. Reply Box 1545, Modern Plastics.

HYDRAULIC PUMPS

Aldrich Pump Co. Vertical Triple HYDRAULIC PUMPS, 3 1/2" x 8", equipped with Herringbone Gears, 67.5 gpm. Maximum pressure for intermittent duty 2,200 lbs., for continuous duty 1,800 lbs. Pump and motor mounted on common bed plate. Motors are 75 HP, 3/60/230-400 volts, 740 RPM. Complete with starting panel, consisting of G.E. motorstarter switch, push button control, square "D" Switch, and Capacitator. Purchased new 3 1/2 years ago. Excellent condition. Available for immediate delivery. Reply Box C268, Modern Plastics.

FOR SALE: Angle Molding Hydraulic Press Watson-Stillman, suitable for Split Molds and for Molding Complicated Parts by the transfer method. 3 horizontal double acting rams, 13 1/2", 8" and 6" arranged in "T". Reply Box C133, Modern Plastics.

WANTED: PLASTIC SCRAP OR REJECTS in any form. Cellulose Acetate, Butyrate, Polystyrene, Acrylic, Vinyl Resin, etc. Also wanted surplus lots of phenolic and urea molding materials. Custom grinding and magnetizing. Reply Box 318, Modern Plastics.

FOR SALE: Tenite II Scrap. Approximately 6,000 lbs. Allied Sales, 233 Mill St., Cin'ti 3, Ohio. Cherry 2317.

AVAILABLE: Plastics Extrusion Engineer. Master Mechanic. Capable of taking full charge extrusion department. Can design adapters, dies and fixtures necessary to engineer extrusion jobs. 7 years experience various types plastics. Best of references. Will go anywhere. Reply Box C391, Modern Plastics.

FOR SALE

1-4 Cavity Injection Mold Plastic Smoking Pipe Bowl. Good Condition. Contact: Albert Levy & Co. 2006-75 St. Bklyn, 4, N. Y. Bensonhurst 6-1725

WANTED: Representatives calling on electrical manufacturers of appliances, radios, relays, switches, auto equipment, etc. By company specializing in volume production of small custom molded phenolic parts, including coil forms and bobbins. Commission basis. Mayfair Molded Products Corporation, 4440 N. Elston Avenue, Chicago 30, Illinois.

WANTED

Industrial Enterprise

CASH PAID

For Capital Stock or Assets

by large financially powerful diversified organization wishing to add another enterprise to present holdings. Existing Personnel Normally Retained

Strictly Confidential

Box 1230, 1474 B'way, New York, N. Y.

SALES REPRESENTATIVES, commission basis. Must know industrial users in territory; should know plastic materials and methods. We deep-draw, form, fabricate all plastics including post-forming phenolic and fiberglass laminates. Substantial, midwestern plant, complete equipment, well-staffed. Your reply treated in confidence. Chicago, Minneapolis, St. Louis areas available. Reply Box C393, Modern Plastics.

IF YOU have the dies we have the compression molding time and thermosetting materials. Low estimates given immediately on receipt of sample part and size and number of cavities in dies. This plant is located in Western Canada and we will mold competitively for home or American markets. Reply Box C394, Modern Plastics.

SALES ENGINEER AVAILABLE—Age 27, Graduate Engineer, Accounting background, 3 1/2 years sales research experience, desires responsible sales position with plastics concern. Reply Box C397, Modern Plastics.

FOR SALE—SAV-WAY PACEMAKER 1 to 2 Ounce Injection Molding Machine, Designed for Experimental, Educational and Production Use.

Pacemaker Specifications: Capacity, 20 tons; Maximum stroke, 11 1/2"; Lower platen, 10 x 10"; Mold casting area, 4 square inches; Current, 220 volt, 3 phase; Heating elements, 1000 watts; Floor space, 29 x 30"; Height, 6 1/2 feet; Gross weight, 1200 lbs.; Line pressure, 0 to 2000 (P.S.I.) Independent switches for heating elements and hydraulic system. Large capacity hopper with convenient manual quantity control. Standard Equipment: Electronic temperature control, (0 to 500° Fahrenheit); Pressure gage, 0 to 3000 pounds; Motor, 3 H.P.

Special Equipment: Indicating pyrometer, controlling heat to plus or minus 1° Fahrenheit. Reply Box C395, Modern Plastics.

CAPITAL TO INVEST: Will invest up to \$30,000 in reliable, profitable business, with eventual active participation. Must stand unhampered thorough investigation. Reply Box C406, Modern Plastics.

MOULDER WANTED with Injection Machines to lease on royalty basis. Extension garment hanger covered by "Patent Rights." A product without competition. Frank Simon, 961 Eastern Parkway, Brooklyn, N. Y. PR 2-1964.

LARGE MANUFACTURER will consider in confidence for purchase or royalty, ideas in the following categories, small specialties, utensils, novelties, or sundries for home, office, kitchen, desk, pocket, automobiles, or sports to be made of plastic, metal, or wood. Write Box C396, Modern Plastics.

FOR SALE: Hydraulic Presses: 32 x 50", 24" ram, 700 ton, 21" x 24", 20" ram, 500 ton, 36" x 52", 14" ram, 385 ton, 36" x 36", 16" ram, 200 ton, 26" x 30", 15" ram, 177 ton, 13" x 19", 12" ram, 100 ton, 19" x 24", 19" ram, 78 ton, 23" x 17", 8" ram, 75 ton, 15" x 15", 8" ram, 75 ton, 12" x 12", 7 1/2" ram, 50 ton, 12" x 13", 6 1/2" ram, 42 ton, 8" x 9 1/2", 4 1/2" ram, 20 ton, 16" x 16", 3 1/2" ram, 12 ton; Pumps: New Dual Rotary Pumping Units: HPM Triplex 1 1/2 GPM 2500#; Robertson Duplex 1 1/2 GPM 4000#; Worthington Triplex 12 GPM 2500#; Gould Triplex 12 GPM 1250#; Worthington 2 1/2 GPM 4000#; 4 plunger 6 GPM 2000#; Watson Stillman Duplex 1 GPM 2500#; Laboratory Mill 7" x 14", Extruder, No. 3 Royle Perfected; W&P unjacketed sigma blade mixer, 100 gal. cap.; Laboratory Presses, Hydro-Pneumatic and weighted type accumulators, etc. **HIGHEST PRICES PAID FOR YOUR USED EQUIPMENT.** Universal Hydraulic Machinery Company, 285 Hudson Street, New York City 13.

WANTED TO BUY

INJECTION MACHINES

LARGE SIZES

HPM—Reed-Prentice—Lester. Must be in first class condition.

Write giving full details type, age, capacity, general condition and price asked to Box C399, Modern Plastics.

FOR SALE: 1" Grade C natural phenolic sheet, 36 x 48, special lot prices; 1/2" XX natural phenolic sheet, 10% discount; 1/2" XX natural rod, 12-39" lengths, 25% discount; 1 1/2" I.D. x 3/2" grade C tube, 36" length, 1400 ft. 50% discount; 1 1/2" I.D. x 3/2" Grade L natural tube, 36" lengths, 50% discount; 1 1/2" x 1/2" fiber tube, 1100 feet, mostly 36", various colors, 50% discount; 2" Masonite die stock, sheets 48 x 72, \$1.75 sq. ft. All sales net cash, FOB Kansas City. Prices subject to change without notice; all items subject to prior sale. Plastic Pressed Forms, Inc., 325 Southwest Blvd., Kansas City 8, Mo. Telephone: Harrison 6648.

SALES ENGINEER—PLASTIC PLANT To solicit custom molding for well established manufacturer. Engineering degree preferred or equivalent. Experience with plastic molding desirable but not essential. Experience selling industrial accounts important. Chicago plant. Liberal commission arrangement. Permanent affiliation desired. Territories now open: Chicago area, Detroit, Cleveland, Buffalo, Pittsburgh, New York, St. Louis, Kansas City, Indianapolis, Texas, Denver, Seattle, San Francisco, Atlanta. Reply Box C401, Modern Plastics, 221 North LaSalle St., Chicago, Ill.

TO ATTAIN excellence in plastic molding, many steps—each an essential part of the whole process—must be followed through accurately and thoroughly.

Every step of the way—designing, mold making, molding, and finishing—calls for the highest skill and experience, plus the proper plant facilities for efficient production. Combined, these operations can result in quality molding... plastics that "measure up" in performance, appearance and cost.

MACK experience and proven methods, plus three completely equipped plants, offer plastic molding that qualifies. Your inquiries are solicited; address Mack Molding Company, Inc., 100 Main Street, Wayne, N. J.

Mack
MOLDED
EXCELLENCE



MACK PLANT AT
ARLINGTON, VERMONT

MACK PLANT AT
WATERLOO, P. Q., CANADA

MACK PLANT AT
WAYNE, NEW JERSEY

FOR SALE: Stokes type 300 Automatic Molding Press; Stokes Rotary Preform Tablet Machines 1½", 1¼", 1" & ¾"; Injection Molding Machines 2 oz. to 12 oz.; Baker Perkins Jacketed Mixers 100, 20 & 9 gals. capacity; New Rotary Cutters; HPM 500 ton Mold. Presses 42" x 48"; D.B.B. 500 ton 42" x 48"; Adamson 400 ton 27" x 24"; 30" x 20"; also 20 to 250 tons from 36" x 36" to 12" x 12"; Farrell 16" x 48"; 2 Roll Rubber Mill; 40 ton Broaching Press; Watson-Stillman Hor. 4 Plgr. 1" x 2" x 4" H. & L. Pressure Pumps; HPM 1½" x 6" vertical triplex 10 GPM 2700 lbs.; 7 Hydr. Oil Pumps; Vickers Oil gear, Northern, etc.; Elmes 1" x 4" & 1½" x 4" hor. 4 plgr. 3 to 8 GPM 4500 lbs. & 5500 lbs.; Rumsey 4½" x 8" vert. Triplex 65 GPM 900 lbs.; Elmes 2½" x 4" hor. 2 plgr., 17 GPM 850 lbs.; New Vickers 1½" Oil Relief Valves; New Vickers ¼" Flow Control Valves; Hydr. Steam Pumps; Low Pressure Pumps 150 to 600 lbs.; Hydr. Accum.; Heavy duty Mixers; Grinders; Pulverizers; Gas Boilers; etc. **PARTIAL LISTING. WE BUY YOUR USED MACHINERY. STEIN EQUIPMENT CO., 90 WEST ST., NEW YORK 6, N. Y. WORTH 2-5745.**

SALES REPRESENTATIVE experienced in selling custom compression and injection molding work desired by midwest manufacturer. Mich., Ind., Ill., and Wis., territories available. Straight commission basis. Reply Box C400, Modern Plastics.

ATTENTION CUSTOM MOLDERS: Young veteran, 24, wishes to start career in Custom Plastic Molding with firm in New York City. Willing to start from bottom. Have had 1½ years college (Mech. Eng.) and 2 yrs. machine shop experience setting up and operating all types of metal cutting machines. Now employed in plastic firm operating compression & injection presses. Reply Box C402, Modern Plastics.

FOR SALE: 1 x 3 inch Card Label Holders, Black, Blue, Buff, 4,000,000—\$1.50 per M. 500,000 or more—\$2.00 per M. 25,000 or more—\$4.50 per M. Good Buy even for salvage. Ideal for Label Holders for shelves, shelf boxes, bins, name plates for doors of residences, convention badges, etc. Prior Sale. Shadur Paper Box Company, 5110 No. 35th Street, Milwaukee 9, Wis.

FOR SALE

6 oz. Reed-Prentice Injection Molding Machines. Aaron Machinery Co., Inc., 45 Crosby St., N.Y.C.

FOR SALE: Semi-Automatic Transfer Molding Press with 16" ram and 5" cylinder; LaRoc electronic preheater; Stokes R preformer; 66 cavity transfer mold with two force plates chrome plated; Henderson tumbling barrel. All equipment can be demonstrated under power. Reply Box C403, Modern Plastics.

FOR SALE: Never used (New) 9 oz. H.P.M. Injection press, complete, all accessories, including oil. Will sell at reduced price. Reply Box C414, Modern Plastics.

MECHANICAL ENGINEER thoroughly skilled all phases of planning, mold engineering, cost estimating and production control, desires managerial position. Has specialized in thermoplastic molding, also thermosetting and extrusion. Past experience includes plant set up, personnel supervision, purchasing, plant coordination, and process development. Will consider position abroad. Can be available September 1st. Reply Box C494, Modern Plastics.

PLASTIC MATERIALS CHEMIST Desires responsible position. Proven technical and executive ability. Skilled in manufacture of thermoplastic molding powders, scrap conversion. Plant design and operation. Extrusion molding and injection molding, all phases. Reply Box C405, Modern Plastics.

PRODUCTION CHEMIST

To handle compounding of thermo-setting material on mills. Must have ability to supervise department and production. Good opportunity. Located in midwest. Reply Box C407, Modern Plastics.

ITEM OF UNIVERSAL USAGE—Modern innovation and plastic adaptation of office necessity for combined use as a label and envelope moisture, serves as a decorative paper weight, spillproof, practical and attractive. Thermoplastic material recommended. employs use of simple die. Patent Pending; royalty basis. Reply Box C408, Modern Plastics.

MECHANICAL ENGINEER

For plant of 200 employees located in midwest. Must be familiar with presses, accumulators, mills, hydraulics, steam, air and water lines, etc. To supervise complete maintenance department in expanding company. Excellent opportunity. Reply Box C409, Modern Plastics.

THIRTY YEARS SELLING ACQUAINTANCE IN NEW YORK. My contacts are with large manufacturers of nationally advertised products. Also have wide acquaintance among larger advertising agencies. Would like to hear from manufacturers of plastic products, or raw materials for plastic products. Willing to finance myself if product is sufficiently interesting. Reply, Box C410, Modern Plastics.

CHEMIST: 30, presently employed; desires change. Well grounded in all types of pigments and dyestuffs, and experienced with injection and extrusion molding powders and processes. Good appearance, well spoken. Will consider any interesting, promising position in production development, sales, technical service, administrative, \$75 weekly. Please respond to Box C411, Modern Plastics.

EXECUTIVE

Available shortly. Long experience and thoroughly familiar all types of plastic and their uses. Mature business judgment combined with the ability of creative thinking. Record successful accomplishments. Used to dealing with top management in selling ideas and applications. Present position general manager. Desires similar position or sales or district representative. Reply Box C412, Modern Plastics.

ENGLISH RESEARCH CHEMIST, age 32, B.S. with honor, London, A.R.I.C., seeks responsible position Plastics or Rubber Industry. At present, President, half-owner English Plastics Moulding Company. Previous plastics, synthetic and natural rubber experience in charge of research laboratory; two years United States as Technical Adviser to British Government. Requires settle in U. S. because of American wife. Reply Box C413, Modern Plastics.

BALL & JEWEL PLASTIC GRINDER NEW No. 2 Patent Rotary Cutter, Outboard SKF Roller Bearings, Belt Driven type with Tex-Rope Drive complete with 3 screens ¾", ½" and ¼" holes, Magnetic Hopper, Wrench and Knife Gauge. Considerably less than cost price. Also 40 H.P. motor at cost. Whyte Manufacturing Company, Inc., 115 Fourth Avenue, New York, New York.

FOR SALE: One completely equipped OHD-12 HPM Hydropower Operating System including one 4R-10 Radial Pump with a 3 H.P. Sleeve Bearing Motor, 25 gallon reservoir base and all necessary valves. System was purchased new in 1945 and was in operation only one year. System as sold is in perfect operating order and ready for immediate use. Plastic Research Products Co., 200 Beech Street, Urbana, Ohio.

INDIA—Established India sales organization desires contact with manufacturers of plastics resins. Molded products and machinery with view to representation in India. Reply A. M. Gandhi, T. D. Gandhi & Co., 1511 So. Manhattan Pl., Los Angeles 6, Calif.

SIX YEARS actual plant experience in injection, compression, and low-pressure molding; process engineering, supervision, finishing, estimating, design and development. Young man 32, Mechanical Engineer, veteran, desires permanent position with reputable firm. Interested in sales with equipment or material manufacturer, or with large concern using plastics and having place for plastic trained man in design or procurement. Reply Box C392, Modern Plastics.

AVAILABLE: Have had four years experience in the maintenance and operation of Reed-Prentice and DeMattia injection molding machines. Installation of new molds, break-in and production set-up. Have the know-how required of a good molder. Mechanically inclined. Graduate of Plastics Industries Technical Institute. Can take complete charge of molding department. Reply Box C398, Modern Plastics.

HEATING OVEN FOR SALE—Including 24 trays. Dimensions 38" wide 26" deep 24" high. Mounted on 40° angle iron legs. All sides of oven insulated. Thermostat on outside marked 200 to 500. Six units 1" x 32" 110 volt A.C. Switch Plate reads—Ampere 30—Pole 2—volts 250-230 A.C.—230 D.C. Plaza Mfg. Co., Inc., 869 Broadway, New York 3, N. Y.

PLASTIC FABRICATOR, Philadelphia, Pa., had own shop and seven years experience all phases fabricating acrylics (Plexiglas) and cellulose acetate into containers, displays, furniture; desires interesting contract proposition in supervisory capacity managing and/or starting your Plastic fabricating plant or department in Los Angeles area. Will move family there. Further information supplied. Reply Box C415, Modern Plastics.

FOR SALE: Taber Thermofold 90 degree folding machine. Practically brand new. Cost \$675.00. Best offer takes it. Rochester Wire-O Binding, 49 Andrews St., Rochester 4, N. Y.

PLASTICS ENGINEER—Available for sales or management. Excellent background in all thermoplastic molding, die design, product development, supervision, molding machinery, client contact. Expert knowledge of Nylon molding problems. Will locate anywhere opportunity offers. Write Box C416, Modern Plastics.

FRENCH COMPANY in Paris, which has specialized in the import of raw materials, chemicals for plastic manufacture, cellulose acetate and other plastic material, powder, sheets; proposes collaboration with U. S. A. Manufacturer desiring to find important openings on the French market. Highest references furnished. Societe des Produits pour l'Industrie et l'Agriculture, 11 Rue de Provence, Paris, France.

FOR SALE

1—200 Ton Self-Contained Hydraulic Plastic Molding Press.
New York Air Brake Co. mfr.: 6—L-252 Hy-Lo Hydraulic Power Units consisting of a Double End 5 HP. 1200 RPM Electric Motor driving a Direct Connected L.P. Pump and a H.P. Pump to provide pressure to 3000 psi.
Hydraulic Hi-Speed Co. mfr.: 18—JA-175-NC-3M Cam Operated 2-Way Valve with Integral Check, ¾" Pipe Tap, 18 GPM.; 21—H4-175-C Double Solenoid Operated 4-Way Valve, ¾" Pipe Tap, 18 GPM.; 7—H4-175-C3M Double Solenoid Operated 4-Way Valve, ¾" Pipe Tap, 18 GPM.
All the above equipment is NEW and can be used in connection with Hydraulic Presses. Ensminger & Company, 57 Wood St., Wilkes-Barre, Penna.

Graduates of



PLASTICS INDUSTRIES TECHNICAL INSTITUTE

Resident School have received instruction in the following subjects:

	HOURS		HOURS
Basic Plastics Theory	50	Compression Mold Design	50
Industrial Arts	50	Injection Automatic Compression	
Fabrication Shop	50	and Extrusion Molding	50
Plaster Patterns	50	Transfer and Injection Mold Design	50
Advance Industrial Arts	50	Laminating Operations	50
Advance Fabrication Shop	50	Advance Mold Theory	50
Advance Plaster Patterns	50	Low Pressure Laminating	50
Casting and Forming	50	Physical Testing of Plastics	50
Mold Theory	50	Advance Theory and Practice	450
Compression and Transfer Molding	50	TOTAL	1500

All training at Plastics Institute is practical, comprehensive, using industry type equipment in laboratories and shops. The newest methods are taught as soon as their application becomes practicable.

WE SUBMIT FOR YOUR CONSIDERATION, GRADUATES, many with actual industry experience, in all sections of the country. Write to the Plastics Institute office nearest you stating your requirements. We will endeavor to recommend the person best suited to meet your needs.

Forums, Resident School and Home Training
Courses APPROVED FOR VETERANS

Plastics

INDUSTRIES TECHNICAL INSTITUTE

For information write DEPT. MP 7-8

NEW YORK 17, 122 E. 42nd St. ★ CHICAGO 13, 3810 N. Broadway ★ LOS ANGELES 6, 1601 S. Western Ave.

Francis Gudger, president—John Delmonte, technical director

MODERN PLASTICS ADVERTISERS

AUGUST 1947

Adamson United Co..... 81	Carver, Fred S., Inc..... 10	Durez Plastics & Chemicals, Inc.
Agency—SMITH, TAYLOR & JENKINS, INC.	Agency—J. C. BULL, INC.	..... Inside Front Cover
Airtronics Mfg. Co..... 170	Catalin Corp. of America..... 1	Agency—COMSTOCK, DUFFES & COMPANY
Agency—LARRY PENDLETON & ASSOC.	Agency—WALTER J. GALLAGHER ADV.	Durite Plastics, Inc..... 60
Aldrich Pump Co., The..... 182, 183	Cavagnaro, John J..... 187	Agency—LAWRENCE I. EVERLING
Agency—HARRIS D. MCKINNEY	Celanese Plastics Corp. (Div. of	Eagle Tool & Machine Co..... 234
Aluminum Co. of America..... 23	Celanese Corp. of America)..... 11, 216	Agency—GALLARD ADVERTISING AGENCY
Agency—FULLER & SMITH & ROSS INC.	Agency—ELLINGTON & CO., INC.	Eastman Kodak Co..... 215
American Anode Inc..... 44	Celluplastic Corp..... 46	Agency—J. WALTER THOMPSON CO.
Agency—THE GRISWOLD ESHLEMAN CO.	Agency—LAWRENCE FERTIG & COMPANY, INC.	Elco Tool & Screw Corp..... 73
American Cyanamid Co..... 142, 143	Central Screw Co..... 73	Electric Auto-Lite Co., The..... 223
Agency—HAZARD ADVERTISING CO.	Chemaco Corp..... 65	Agency—RUTHRAUFF & RYAN, INC.
American Hard Rubber Co..... 240	Agency—R. T. O'CONNELL CO.	Elmes Engineering Works of
Agency—W. L. TOWNE ADVERTISING	Chicago Molded Products Corp.. 4	American Steel Foundries..... 51
American Injection Molders, Inc. 225	Agency—ALMON BROOKS WILDER, INC.	Agency—ERWIN, WASEY & CO., LTD.
American Insulator Corp..... 83	Claremont Waste Mfg. Co..... 144	Emery Industries, Inc..... 88
Agency—WILLIAM B. KAMP, INC.	Agency—WALTER J. GALLAGHER ADV.	Agency—RUTHRAUFF & RYAN, INC.
American Mirror Works..... 166	Classified..... 242, 244	Enjay Co., Inc..... 207
American Plastics Engineering Corp..... 197	Cleveland Container Co..... 217	Agency—McCANN-ERICKSON, INC.
American Pulverizer Co..... 162	Agency—THE NESBITT SERVICE COMPANY	Enjay Co., Inc..... 213
Agency—EGGERS-RANKIN ADVERTISING SERVICE	Colton, Arthur, Co..... 232	Erie Engine & Mfg. Co..... 191
American Screw Co..... 73	Columbia Protektosite Co., Inc.. 241	Agency—THE YOUNT CO.
Anigraphic Process, Inc..... 179	Agency—A. W. LEWIN CO.	Erie Resistor Corp..... 45
Atlas Valve Co..... 228	Columbian Rope Co..... 48	Agency—W. S. HILL CO.
Agency—W. F. SCHAFHÖRST AGENCY	Agency—BARLOW ADVERTISING AGENCY, INC.	Fabiricon Products, Inc..... 187
Auburn Button Works..... 28	Consolidated Molded Products Corp..... 227	Famco Machine Co..... 195
Agency—CHARLES L. RUMRILL & CO.	Agency—WALTER J. GALLAGHER ADV.	Agency—WESTERN ADV. AGENCY
Bakelite Corp..... Inside Back Cover	Continental Screw Co..... 73	Farley & Loetscher Mfg. Co..... 224
Agency—J. M. MATHES, INC.	Cook, Lawrence H., Inc..... 180	Agency—WESTON-BARNETT, INC.
Baker Castor Oil Co..... 79	Agency—GEORGE T. METCALF CO.	Farrel-Birmingham Co., Inc..... 84
Baldwin Locomotive Works, The 77	Corbin Screw Div. of American Hdw. Corp..... 73	Agency—GASSAWAY MARK & CO.
Agency—KETCHUM, MACLEOD & GROVE, INC.	Creative Printmakers, Inc..... 186	Fellows Gear Shaper Co., Plastics Machine Divs..... 61
Ball & Jewell, Inc..... 233	Cruver Mfg. Co..... 9	Agency—HICKS & GREIST, INC.
Agency—LAWRENCE BOLES HICKS, INC.	Agency—EVANS ASSOCIATES	Ferro Enamel Corp..... 106
Bamberger, A., Corp..... 238	Cumberland Engineering Co.... 235	Agency—FULLER & SMITH & ROSS INC.
Agency—H. W. FAIRFAX ADV. AGENCY INC.	Agency—RICHARD THORNDIKE PRECISION ADV.	Firestone Industrial Products, Velon Div..... 27
Barco Mfg. Co..... 68	Daniels - Kummer Engraving Co. 162	Agency—GREY ADV. AGENCY, INC.
Agency—CAMPBELL-EWALD CO. OF N. Y., INC.	Defiance Machine Works, Inc.... 249	Formica Insulation Co., The.... 56
Becker, Moore & Co., Inc..... 194	Agency—BEESON-FALLER-REICHERT, INC.	Agency—CHESTER C. MORELAND CO.
Bell Telephone Laboratories.... 192	DeMattia, M. P. Engineering Co. 228	Fortney Mfg. Co., Inc..... 174
Agency—N. W. AYER & SON, INC.	Agency—GEORGE HOMER MARTIN	Franklin Jeffrey Corp..... 172
Bethlehem Steel Co..... 64	DeMattia Machine & Tool Co.... 29	Franklin Plastics Div..... 231
Agency—JONES & BRAKELEY, INC.	Agency—GEORGE HOMER MARTIN	Agency—THE YOUNT CO.
Blaw-Knox Co..... 47	Detecto Scales, Inc..... 185	French Oil Mill Machinery Co., The..... 179
Agency—AL PAUL LEFTON CO., INC.	Agency—LOUIS M. COTTIN & CO.	GMC Process Corp..... 250
Boonton Molding Co..... 57	Detroit Macoid Corp..... 31	Gagnon, Maurice A., Co..... 196
Agency—THE FRANKLIN FADER CO.	Agency—HOLDEN, CLIFFORD, FLINT, INC.	General American Transportation Corp..... 164
Brillhart, Arnold, Ltd..... 200	Dickten & Masch Mfg. Co..... 235	Agency—WEISS & GELLER
Agency—HENRY LAMOTHE AGENCY	Disston, Henry, & Sons, Inc..... 22	General Chemical Co..... 76
Brown, J. J. & Co., Inc..... 205	Agency—GEARE-MARSTON, INC.	Agency—ATHERTON & CURRIER, INC.
Cabot, Godfrey L., Inc..... 38	Dow Chemical Co., The..... 163	General Electric Co..... Back Cover
Agency—LARCOM RANDALL	Agency—MACMANUS, JOHN & ADAMS, INC.	Agency—BENTON & BOWLES, INC.
Carborundum Co., The..... 203	Duplan Corp, The..... 141	General Industries Co., The..... 219
Agency—COMSTOCK, DUFFES & CO.	du Pont de Nemours, E. I. & Co. Plastics Division..... 7	Agency—FULLER & SMITH & ROSS INC.
Carpenter Steel Co., The..... 206	Agency—BATTEN, BARTON, DURSTINE & OSBORNE, INC.	(Please turn to page 248)
Agency—BRAUMONT, HELLER & SPERLING, INC.		



PLASTIC GUN STOCK
and parts... molded for
JOHNSON INDOOR TARGET GUN
by **PLASTIC MANUFACTURERS**



The Johnson Indoor Target Gun was recently featured in Life Magazine. Illustration above shows the plastic gun stock molded for Johnson Automatics, Inc., makers of the gun, by Plastic Manufacturers. This company also produced two other plastic parts: the molded butt plate shown assembled with the stock; and the pellet carrier, which like the other two parts, is transfer molded of phenolic material. The plastic parts were designed to meet the Johnson Gun's unusual requirements for accuracy. Write for a copy of the interesting story outlining the development and production of this popular new indoor gun.



**PLASTIC
MANUFACTURERS**
INCORPORATED

STAMFORD, CONNECTICUT

INJECTION, TRANSFER AND COMPRESSION MOLDING

COMPLETE ASSEMBLY

REPRESENTATIVES: NEW YORK 1, N. Y. — 19 W. 34th ST. • DETROIT 2, MICH. — 805 NEW CENTER BLDG. • LOS ANGELES, CAL. — 1440 ROBERTSON BLVD. • PITTSFIELD, MASS. — 329 CONNECTICUT AVE. • WARREN, OHIO — 2614 E. MARKET ST.

AUGUST • 1947 247

General Molded Products, Inc. ... 32 <i>Agency—DONALD DENTON</i>	Keyes Fibre Co. 75 <i>Agency—ALLEY & RICHARDS Co.</i>	Moslo Machinery Co. 12
Gering Products, Inc. 62 <i>Agency—DIEDRICH ADVERTISING SERVICE</i>	Kingman Co., E. B. 169 <i>Agency—WHITBRY ASSOCIATES</i>	Mt. Vernon-Woodberry Mills. 173 <i>Agency—J. B. RUNDLE ADVERTISING</i>
Giddings & Lewis Machine Tool Co. 63 <i>Agency—THE CRAMER-KRASSELT Co.</i>	Kingsley Stamping Machine Co. 185 <i>Agency—CONNERS & Co.</i>	Muehlstein, H., & Co. 229 <i>Agency—GOOLD AND TIERNEY INC.</i>
Glenn Electric Heater Co. 167	Koppers Company, Inc. Penn-sylvania Coal Prod. Dept. 80 <i>Agency—CABOT & COFFMAN, INC.</i>	Multi Color Graph Corp. 232
Goodrich, B. F., Chemical Co. 3, 44 <i>Agency—THE GRISWOLD-ESHELMAN Co.</i>	Kuhn & Jacob Molding & Tool Co. 220 <i>Agency—ELDRIDGE-NORTHROP, INC.</i>	National Erie Corp. 86 <i>Agency—DAVIES & MCKINNEY</i>
Great American Color Co. 194 <i>Agency—BODINE & MEISSNER</i>	Kurz-Kasch, Inc. 26 <i>Agency—KIRCHER, HELTON & COLLETT</i>	National Lock Co. 73
Greater New Orleans, Inc. 50 <i>Agency—BAUERLEIN ADVERTISING</i>	Kux Machine Co. 52 <i>Agency—KUTTNER AND KUTTNER</i>	National Plastic Products Co., The. 35 <i>Agency—THE JOSEPH A. WILNER Co.</i>
Great American Plastics Co., The. 225 <i>Agency—WILLIAM G. SEIDENBAUM & Co.</i>	Lamson & Sessions Co. 73	National Rubber Machinery Co. 21 <i>Agency—THE GRISWOLD-ESHELMAN Co.</i>
Grigolett Co., The. 54 <i>Agency—MACE ADVERTISING AGENCY, INC.</i>	Lane, J. H., & Co., Inc. 168	National Screw & Mfg. Co. 73
Gypsy Dyes, Inc. 188 <i>Agency—JOHN FRANKEL COMPANY</i>	LaPointe-Plascomold Corp. 236 <i>Agency—EDWARD M. BALDWIN, JR. INC.</i>	Newark Die Co., Inc. 190 <i>Agency—ATLANTIC ADVERTISING Co.</i>
Hannifin Corp. 226 <i>Agency—ARMSTRONG ADV. AGENCY</i>	LaRose, W. T. & Associates, Inc. 66	New England Screw Co. 73
Harper, H. M., Co., The. 73	Lea Mfg. Co., The. 177 <i>Agency—SANGER-FUNNELL, INC.</i>	New Hermes, Inc. 169 <i>Agency—THE ARNOLD COHAN CORP.</i>
Harwick Standard Chemical Co. 201 <i>Agency—L. H. BUTLER</i>	Lenco Die & Mold Co. 198	Nixon Nitration Works. 161 <i>Agency—ALFRED A. MORSE & Co.</i>
Hein-Werner Corp. 196 <i>Agency—ARTHUR R. MOORE, INC.</i>	Lester-Phoenix, Inc. 165 <i>Agency—GREGORY-HOUSE, INC.</i>	Northern Industrial Chemical Co. 191 <i>Agency—THE CALLAWAY ASSOCIATES</i>
Hercules Powder Co. 16 <i>Agency—FULLER & SMITH & ROSS INC.</i>	Lucidol Div., Novadel-Agene Corp. 204 <i>Agency—LANDSHEFT, INC.</i>	Northwest Plastics, Inc. 178 <i>Agency—FOULKE AGENCY</i>
Heyden Chemical Corp. 85 <i>Agency—PAUL KLEMTNER & Co., INC.</i>	Mack Molding Co., Inc. 243 <i>Agency—GEORGE HOMER MARTIN</i>	Olsen, Tinius, Testing Machine Co. 36 <i>Agency—RENNER ADVERTISERS</i>
Hinde & Dauch Paper Co., The. 39 <i>Agency—HOWARD SWINK ADV. AGENCY INC.</i>	Manufacturers Chemical Corp. ... 65 <i>Agency—R. T. O'CONNELL Co.</i>	Owens-Illinois Glass Co. 149 <i>Agency—J. WALTER THOMPSON Co.</i>
Hopp Press, Inc., The. 205 <i>Agency—GALLARD ADVERTISING AGENCY</i>	Marblette Corp., The. 25 <i>Agency—PERLOWIN STUDIOS</i>	Parker-Kalon Corp. 33, 37 <i>Agency—HORTON-NOYES Co.</i>
Hydraulic Press Mfg. Co., The. 13 <i>Agency—FULLER & SMITH & ROSS INC.</i>	Martindell Molding Co. 229 <i>Agency—ELDRIDGE-NORTHROP, INC.</i>	Pawtucket Screw Co. 73
Hotel Tuller. 171 <i>Agency—HARRY ATKINSON INCORPORATED</i>	Maywald, Elmer C. & Co., Inc. ... 210 <i>Agency—ROBERT A. GALLAGHER, ADV.</i>	Pennsylvania Coal Products Co. 80 <i>Agency—CABOT & COFFMAN, INC.</i>
Ideal Plastics Corp. 221 <i>Agency—ATLANTIC ADVERTISING Co.</i>	Mearl Corp., The. 197	Pfizer, Chas., & Co., Inc. 82 <i>Agency—DOYLE, KITCHEN & McCORMICK, INC.</i>
Industrial Plastic Co. 167 <i>Agency—WALTER L. RUBENS & Co.</i>	Mears-Kane-Ofeldt, Inc. 178 <i>Agency—R. E. LOVEKIN CORP.</i>	Pheoll Mfg. Co. 73
Industrial Synthetics Corp. 157 <i>Agency—SHAW ASSOCIATES</i>	Metasap Chemical Co. 231 <i>Agency—CHARLES DALLAS REACH Co.</i>	Phillips Screw Manufacturers... 73 <i>Agency—HORTON-NOYES Co.</i>
Injection Molding Co. 213 <i>Agency—RUSSELL C. COMER Co.</i>	Meyer & Brown Corp. 188 <i>Agency—FREIWALD & COLEMAN</i>	Plaskon Div., Libbey-Owens-Ford Glass Co. 136-137 <i>Agency—MELDRUM & FEWSMITH</i>
Insulation Mfg. Co. 24 <i>Agency—SCHANK ADVERTISING</i>	Michigan Molded Plastics, Inc. 251 <i>Agency—WALLACE-LINDEMAN, INC.</i>	Plastex Corp., The. 211 <i>Agency—JOHN STOVER ADV. AGENCY</i>
Interlake Chemical Corp. 69 <i>Agency—THE BAYLESS-KERR Co.</i>	Midland Die & Engraving Co. 130 <i>Agency—BEHEL & WALDIE & BRIGGS</i>	Plastic Manufacturers, Inc. 247 <i>Agency—J. C. BULL, INC.</i>
International Molded Plastics, Inc. 175 <i>Agency—THE WHITE ADVERTISING Co.</i>	Midwest Molding & Mfg. Co. 204 <i>Agency—ROBERT A. GALLAGHER, ADV.</i>	Plastic Molding Corp. 195
International Screw Co. 73	Milford Rivet & Machine Co. 37	Plastics Industries Technical Institute. 245 <i>Agency—BEAUMONT & HOHMAN, INC.</i>
Inter-State Products Co. 217 <i>Agency—KURK & BROWN, INC.</i>	Mills, Elmer E., Corp. 37 <i>Agency—BOZELL & JACOBS, INC.</i>	Plax Corp. 19 <i>Agency—THE CHARLES BRUNELLE Co.</i>
Jeffrey, Franklin Corp. 172	Minnesota Plastics Corp. 40 <i>Agency—WILSON ADVERTISING AGENCY</i>	Preis, H. P., Engraving Machine Co. 234 <i>Agency—W. O. NETTLETON & ASSOCIATES</i>
Johnston & Jennings Co., The. 180 <i>Agency—HENRY T. BOURNE ADV. AGENCY</i>	Miskella infra-red Co., The. 190 <i>Agency—FOLY ADVERTISING AGENCY</i>	Pro-phy-lac-tic Brush Co. 14 <i>Agency—LAMBERT & FEASLEY, INC.</i>
Kearney & Trecker Corp. 8 <i>Agency—KLAU-VAN PIETERSOM-DUNLAP ASSOCIATES</i>	Monarch Machine Tool Co., The 78 <i>Agency—FULLER & SMITH & ROSS INC.</i>	Pyro Plastics Corp. 53 <i>Agency—PDA</i>
	Monsanto Chemical Co. 87, 193 <i>Agency—GARDNER ADVERTISING Co.</i>	
	Mosinee Paper Mills Co. 189 <i>Agency—KLAU-VAN PIETERSOM-DUNLAP ASSOCIATES</i>	

(Please turn to page 250)

A BRESKIN PUBLICATION MODERN PLASTICS



Published by MODERN PLASTICS, INC.
122 East 42nd Street New York 17, N. Y.

Bryant Electric Repeats!



BOUGHT ONE—
NOW HAVE EIGHT
**DEFIANCE
PREFORM PRESSES**

The Bryant Electric Co.
bought ONE Defiance
Model 20 Plastic Preform
Press for their Hemco Plastics
Division, Bridgeport, Conn.!

It did the job *so much better*—now they
have EIGHT!

On production, each machine can turn out
4000 lb. in an 8 hour shift—when largest die is
used (approx. 2 3/8" by 3 7/8"). Dies range from a 14
punch 1/2" dia. up to the 3" round and the large rectangu-
lar die mentioned above.

Bryant Electric is one of the many companies today *repeating* their orders
for Defiance Preform Presses! They all want these Defiance advantages—

- More speed... less down time... fewer rejects.
- Die and color changes in 30 minutes.
- Adjust density and fill while machine operates.

Many more *plus* features! Write for bulletins. Defiance Machine Works,
Inc., Defiance, Ohio.

97
YEARS OF
PRECISION
MANUFACTURING

DEFIANCE

PLASTIC PREFORM PRESSES

Radio Corporation of America... 55 <i>Agency—J. WALTER THOMPSON CO</i>	Southington Hdwe Mfg. Co., The 73 Standard Tool Co..... 172 <i>Agency—THE DAVIS PRESS, INC.</i>	Union Carbide & Carbon Corp... Inside Back Cover <i>Agency—J. M. MATHES, INC.</i>
Reading Screw Co..... 73	Steel Co. of Canada, Ltd., The.. 73	Union Pacific Railroad..... 58 <i>Agency—THE CAPLES CO.</i>
Reed-Prentice Corp..... 17 <i>Agency—CUTLER AND QUINN</i>	Stekert, Martin M..... 212 <i>Agency—WALTER W. WILEY ADVERTISING</i>	Union Special Machine Co..... 184 <i>Agency—ARMSTRONG ADVERTISING AGENCY</i>
Reichhold Chemicals, Inc..... 153 <i>Agency—MACMANUS, JOHN & ADAMS, INC.</i>	Stensgaard, W. L., & Assoc., Inc. 174 <i>Agency—RUTHRAUFF & RYAN INC.</i>	
Resinous Products & Chemical Co., The..... 159 <i>Agency—NEWELL-EMMETT CO.</i>	Sterling Bolt Co..... 73	Van Dorn Iron Works Co., The.. 237 <i>Agency—STEDFELD-BYRNE AGENCY</i>
Respro Inc..... 41 <i>Agency—HORTON-NOYES CO.</i>	Stokes, F. J., Machine Co..... 209 <i>Agency—McLAIN ORGANIZATION</i>	Velveray Corp..... 134 <i>Agency—HARRY SERWER, INC.</i>
Richardson Co., The..... 6 <i>Agency—THE BUCHEN CO.</i>	Stone & Webster Engineering Corp..... 151 <i>Agency—HAROLD CABOT & CO., INC.</i>	Voges Mfg. Co., Inc., The..... 233 <i>Agency—WAYNE SWANSON ADVERTISING</i>
Robinson Industries, Inc..... 231 <i>Agency—THE YOUNT CO.</i>	Stricker-Brunhuber Co..... 216	Vulcanized Rubber & Plastics Co. 176 <i>Agency—THE SCHUYLER HOPPER CO.</i>
Rockford Machine Tool Co..... 199 <i>Agency—ADVERTISING PRODUCERS ASSOCIATED</i>	Stronghold Screw Products, Inc. 73	
Rohm & Haas Co..... 181 <i>Agency—NEWELL-EMMETT CO.</i>	Sturtevant Mill Co..... 30 <i>Agency—SUTHERLAND-ABBOTT</i>	Waldron, John, Corp..... 170 <i>Agency—ALEXANDER ROSS AGENCY</i>
Rollway Bearing Co., Inc..... 74 <i>Agency—BARLOW ADV. AGENCY, INC.</i>	Swedlow Plastics Co..... 239	War Assets Administration..... 70 <i>Agency—FULLER & SMITH & ROSS INC.</i>
Royle, John & Sons..... 221 <i>Agency—KENTON-BAKER, CO.</i>	Synthane Corp..... 71, 72 <i>Agency—JOHN FALENER ARNDT & CO.</i>	Watertown Mfg. Co., The..... 34
Russell, Burdsall & Ward Bolt & Nut Co..... 73	Synthetic Resins Ltd..... 210	Watson-Stillman Co..... 15 <i>Agency—O. S. TYSON & CO., INC.</i>
	Tarbonis Co., The..... 166 <i>Agency—L. G. MAISON & CO.</i>	White, S. S., Dental Mfg. Co., The..... 198 <i>Agency—PETERSON & KEMPNER, INC.</i>
St. Louis Plastic Moulding Co... 42 <i>Agency—FRANCIS E. WRIGHT ADV. AGENCY</i>	Tennessee Eastman Corp..... 155 <i>Agency—KENYON & ECKHARDT INC.</i>	Wilson Gold Stamping Machine Co..... 171
Santay Corp..... 67 <i>Agency—THE VANDEN CO.</i>	Thropp, Wm. R. & Sons Co.... 168 <i>Agency—RICKARD ADV. AGENCY, INC.</i>	Witeco Chemical Co..... 20 <i>Agency—HAZARD ADVERTISING CO.</i>
Scovill Mfg. Co..... 73	Timken Roller Bearing Co., The 49 <i>Agency—BATTEN, BARTON, DURSTINE & OSBORNE INC.</i>	Wolverine Bolt Co..... 73
Shakeproof, Inc..... 73	Tinnerman Products, Inc..... 43 <i>Agency—THE WHITE ADVERTISING CO.</i>	Worcester Moulded Plastics Co.. 252 <i>Agency—C. JERRY SPAULDING INC.</i>
Shaw Insulator Co..... 18 <i>Agency—THE CHARLES BRUNELLE CO.</i>	Tuller Hotel..... 171 <i>Agency—HARRY ATKINSON INC.</i>	
Sossner Co..... 222 <i>Agency—EHRlich & NEUWIRTH</i>		Yardley Plastics Co..... 59 <i>Agency—BYER & BOWMAN ADV. AGENCY</i>

BRIGHT with GOLD - - LIGHT to HOLD - - QUICKLY SOLD!



◆ Sinuous gold leaf design adds beauty to dark brown plastic surface of this attractive pencil. Pattern adheres permanently—even to sharply curved surfaces like this one. Pencil decorated for Ritepoint Co., St. Louis, Mo.

Close-up of decoration. The G. M. C. process will also give quality appearance to compacts, cigarette cases, novelty jewelry, eyeglass frames, buttons, etc.



Here's how you can enrich your plastics products with gold or silver—combine the light weight of plastics with the lustre of precious metals—and make your product a sure-fire seller!

THE SPECIAL G. M. C.* PROCESS† deposits precious metals onto plastic surfaces in any beautiful, delicate pattern or design you may desire. Immediately—your product sparkles, becomes strikingly unusual—calls attention to itself for its individuality and elegance. And no matter how intricate the design, the metal will not chip or rub off.

Send for complete information today!

G. M. C. PROCESS CORP.

Manufacturers and Decorators in
Electro Deposition of Metals

46 GREAT JONES ST., NEW YORK 12, N. Y.
GRamercy 5-2313

* No connection with General Motors Corporation† Pat. Pending



Time out.. for Cheering!

We haven't turned out all of the extruded, molded or injected plastic products that we'd have liked, but we can take 10 seconds out to cheer the record to date. Despite handicaps, shortages of materials, delays in getting new, modern equipment on order for many months Michigan Molded production has risen to new highs in the past year. That means more products for our customers, and the possibility of accepting new production challenges. So, just one more word . . . before we get back to work . . . if it can be made of plastic, Michigan Molded can make it better, more economically and faster. Over 25 years experience and modern facilities are available to you.



MICHIGAN MOLDED PLASTICS, Inc.

Dexter

Michigan

AUGUST • 1947

251



A GOOD PLACE TO MEET YOUR COMPETITION

With full scale competition in swing once more, new, modern and exclusive features in your product are essential to successful selling and continued profits. To this end, the proven merits of exclusive custom injection moulding and the facilities of Worcester Moulded — the largest in the East — can serve you to advantage, exactly as though they were your own plastics department. Our designing, engineering, moulding and finishing departments offer you complete service in the development of plastic parts and products — a good place — and way — to meet your competition.



Custom Injection Moulding

WORCESTER MOULDED PLASTICS CO.

14 HYGEIA STREET, WORCESTER 8, MASS.

17 East 42nd St., New York 17, N. Y.

130 West Chippewa St., Buffalo 2, N. Y.

You're shaking hands with 22 pressure cookers!

Yes, all 22 leading brands of pressure cookers employ good-looking, comfortable-to-touch, easy-to-hold handles made of BAKELITE phenolic plastics!

There are good reasons why.

Though 22 handles may have 22 different designs, all share in common the striking advantages and superiorities of this basic, modern, dependable plastic material.

This particular formulation is low in heat conductivity—therefore the handle is always cool and touchable on the kitchen stove. It possesses impact strength and heat resistance sufficient to withstand years of rough kitchen handling. It is resistant to such chemicals as cooking greases and harsh soap and scouring compounds. Its handsome, sleek finish is a compliment to any product.

And above all, *its cost is low*, with added savings resulting from its fast curing cycle—simplified manufacture—and easy assembly into end-products.

Such qualities recommend this BAKELITE plastic molding compound to a thousand uses—in the electrical field, in housewares, in precision equipment, in components of unnumbered products—wherever low cost, dependable performance, ease of working and excellent thermal qualities are desirable.

How can you use BAKELITE phenolic molding materials? Write Department 4 for information on the many types available.



TRADE-MARKS

BAKELITE plastics

**"HOW CAN YOU DO IT
BETTER—AND CUT COSTS?"**

Bakelite Corporation may suggest an answer to this all-important question—through use of industry's most versatile material: phenolic plastics.

• ENGINEERED AND MOLDED AT NO. 1 PLASTICS AVENUE



Plastics ride the waves

● First of its kind! It's a one-piece all-plastics dinghy—produced by General Electric for the Beetle Boat Company, New Bedford, Massachusetts. A single giant mold forms the entire nine-foot boat in one unit. General Electric engineers specified the particular plastic materials that make this unique boat leakproof, light, and buoyant... yet so strong and tough that it withstands amazing abuse. And it requires no maintenance!

This is just one more example of what General Electric's complete plas-

tics service can accomplish. G.E. is equipped to design, engineer, and mold plastics parts to meet the individual requirements of your particular job.

So when you think of plastics, think of General Electric, world's largest manufacturer of finished plastics products. Write for your free copy of the interesting booklet, illustrated in color, called "Problems and Solutions in Plastics." Address Plastics Division, Chemical Department, General Electric Company, 1 Plastics Avenue, Pittsfield, Massachusetts.

G-E Complete Service—Everything in Plastics

BACKED BY 53 YEARS OF EXPERIENCE. We've been designing and manufacturing plastics products ever since 1894. G-E research works continually to develop new materials, new processes, new applications.

NO. 1 PLASTICS AVENUE—complete plastics service—engineering, design and mold-making. Our own industrial designers and engineers, working together, create plastics parts that are both scientifically sound and good-looking. Our own toolrooms are manned by skilled craftsmen—average precision mold experience, 12 years.

ALL TYPES OF PLASTICS. Facilities for compression, injection, transfer and cold molding... for high and low pressure laminating... for fabricating. G-E Quality Control—a byword in industry, means as many as 160 inspections and analyses for a single plastic part.

GENERAL  ELECTRIC

CD 47-428

GENERAL ELECTRIC PLASTICS FACTORIES ARE LOCATED IN SCRANTON, PA., MERIDEN, CONN., COSHOCTON, OHIO, FORT WAYNE, IND., TAUNTON AND PITTSFIELD, MASS.



e.
g
o-
w
s.
cs
c-
j-
ts
l-
y
l
n-
g
y-
n-
t.

MODERN PLASTICS

INDEX TO VOLUME 24

SEPTEMBER—1946 THROUGH AUGUST—1947

1 GENERAL INDEX OF TITLES.....	Page 1
2 INDIVIDUAL SUBJECTS.....	Page 3
3 INDEX OF AUTHORS.....	Page 14



MODERN PLASTICS INC.

122 EAST 42nd STREET

NEW YORK 17, N.Y.

1 GENERAL INDEX OF TITLES

ARTICLE	Month	Page	ARTICLE	Month	Page
A					
A brush with 55 molded acrylic parts.....	January	134	Acrylics make good plating barrels.....	December	128
A cold-pour plastic material.....	March	103	Adhesives used in plywood.....	January	96
A four-part polyester impregnated glass mat bucket.....	August	112	Adult games wake a 3-way use of plastics.....	December	99
A glass mat material.....	August	162	Advances in plastics during 1946.....	January	153
A hand-operated injection machine.....	July	117	All-round cabinet replaces open-back model.....	September	121
A high heat resistant polystyrene.....	August	127	Annealing of styrene and related resins.....	October	127
A mammoth acrylic display dome.....	October	106	Annual Canadian S.P.L. conference.....	April	178
A marketing model for plastics.....	May	5	Atom smasher uses low pressure laminate.....	July	91
A multi-purpose protective covering.....	October	101	Auto haze lights of polystyrene.....	March	124
A modern laminating plant.....	September	180	B		
A new industrial grinding wheel.....	May	216	Barrel head and staves are bonded with phenolic resin.....	March	98
A new mottled acrylic sheeting.....	December	121	Beauty from woven polyethylene.....	November	107
A new petroleum product for plastics.....	October	198	Beaver-like coats from resin-treated lamb skins.....	November	110
A new phenolic photographic tank.....	August	166	Belt display boxes.....	July	194
A new preform press.....	June	204	Better tools from molded laminates.....	June	132
A new use for deep drawn laminates.....	February	110	Bring down those costs and prices.....	May	98
A preservative coating that developed from cast fixtures.....	April	112	Britain develops a new structural plastic.....	March	105
A radio case of veneer-kraft laminate.....	August	170	Britain produces acrylic kitchen and bathroom fixtures.....	June	116
A support fastener.....	July	162	Brush backs of fabricated acrylic.....	April	134
A 4-in-1 plastic toy car kit.....	January	131	Building in miniature with vinyl blocks.....	October	103
An all-plastic faucet.....	May	200	C		
An experiment in restaurant tableware.....	September	100	Canada develops a new form of lignin.....	April	106
A vinyl dip-coat.....	July	156	Carrying through a good idea.....	March	117
Acetate containers.....	April	196	Cast phenolic control housing.....	April	190
Acetate sheeting dresses up a closet.....	November	127	Cast phenolic ruled printing plates.....	August	174
Acrylate polymers in Germany.....	August	147	Cast phenolic houses coffee-tea unit.....	June	109
Acrylic aids lighting.....	July	184	Cast plastics and casting processes.....	November	153
Acrylic applicators.....	August	194			
Acrylic dry air pumps.....	April	242			
Acrylic key tags.....	June	212			
Acrylic numbers.....	May	214			
Acrylics improve performance of industrial saltier unit.....	May	114			

ARTICLE	Month	Page	ARTICLE	Month	Page
Cast resin for high-impedance circuits.....	July	99	Methacrylate polymers in Germany.....	July	129
Celulose acetate microphones look and sound well..	January	132	Modern furniture uses plastics.....	October	108
Celulose propionate in the field.....	January	127	Molded acrylic signs show up at night.....	November	131
Chicago plastics exposition.....	June	90	Molded furniture.....	April	188
Christmas and plastics work hand in hand.....	December	89	Molded golf club heads.....	July	101
Clear butyral coating for upholstery.....	September	126	Molded housing for electric manicurer.....	October	109
Close contouring of honeycomb sections.....	May	140	Molded eye shields.....	June	214
Coating with polyvinyl chloride latex.....	October	117	Molded nylon faucet washers.....	June	105
Condensation products of formaldehyde with amides and amines.....	February	161	Molded part helps control yarn windup.....	September	148
Cost analysis of dielectric preheating.....	March	131	Molded plywood makes this desk.....	February	103
Cutting compacts from acrylic sheet.....	February	131	Molded vinyl phonograph records.....	July	107
Creep, long time tensile and flexural fatigue properties of melamine and phenolic plastics.....	May	151	Molding and marketing three lines of styrene bath-room fixtures.....	May	126
D			Molding hollow thermosetting products.....	April	143
Decorating with phenolics and vinyls.....	May	124	Molding phenolic parts of target gun.....	August	131
Die cutting heavy acrylic sheet.....	March	120	More plastics in the new airplane.....	October	89
Drawn acrylic lid on deep freeze unit.....	March	94	N		
Durability counts in kitchen equipment.....	September	99	New acrylic contact laminate.....	October	122
E			New beauty in clocks through plastics.....	February	108
Economics of low pressure plastics.....	April	93	New molding shop at research laboratory.....	September	176
Effect of catalysts and pH on strength of resin-bonded plywood.....	July	123	New thermoset resin.....	August	226
Embossing acrylic.....	August	198	New uses for nylon.....	July	148
Equipment and technique of extrusion.....	October	134	Nine plastics improve new accordions.....	August	98
Ether enters as plasticizers for vinyl coatings.....	December	163	Nitrate covering for propeller blades.....	November	142
Expansion plans of materials producers.....	January	98	Non-woven cotton webs in laminates.....	September	153
Extending resorcinol resin glue with corn gluten....	April	153	Nylon rope heads for new markets.....	August	121
F			Nylon to be made from furfural.....	April	222
Fabricating of cellulose acetate.....	March	138	O		
Fast radio assembly.....	August	180	Oil purifying systems for molding plants.....	June	186
Five advantages of acetate moth suffocators.....	August	101	One machine with four molding functions.....	May	135
Five reasons for phenolic in mangles.....	August	107	Outlets for polyvinyl chloride paste.....	June	110
Five transparent displays.....	August	196	Oxygen as activator and deactivator of polymerization.....	December	158
Five reasons why surgeons use plastics.....	November	102	P		
Flameproofing of cotton fillers in plastic laminates..	March	151	Packaging tools in styrene boxes.....	February	127
Flammability laws.....	April	5	Paper plastics surfacing.....	October	97
Flowers that retain their beauty.....	February	130	Phenolic adapter rings solve motor bearing problem..	July	84
Four plastics—four car accessories.....	June	216	Phenolic massager.....	July	146
Four phenolic parts in observer.....	May	139	Phenolics are being molded into card table tops.....	June	120
Friction cutting of plastics.....	August	135	Photodielectric analysis of materials.....	February	163
Front is back in this radio housing.....	February	128	Plastic boxes can now be made automatically.....	June	123
G			Plastic brushes and their packages.....	May	204
German thermosetting resins.....	May	153	Plastic models promote product and services.....	May	116
German thermosetting resins.....	April	154	Plastic monofilaments are on their way.....	August	89
German manufacture of polyvinyl ethers.....	January	159	Plastic toys.....	June	164
Getting the right color by spray coating.....	November	148	Plasticizer shortage continues.....	January	108
H			Plastic-coated wire.....	April	186
Handbag assembly requires a strong adhesive.....	November	104	Plastics and metal make a sturdy toy roadster.....	April	110
Heat operations in the plastic industry.....	November	135	Plastics and synthetic resin production.....	February	133
Heat resistance, clarity in new acrylic.....	August	119	Plastics are at home in the kitchen.....	April	192
Heavy duty for high-pressure laminates.....	March	97	Plastics are tested for train interiors.....	July	80
High fashion takes to plastics.....	May	212	Plastics as optical cements.....	June	141
Honeycomb core structures.....	September	129	Plastics blameless in Los Angeles blast.....	July	83
How to saw vinylidene chloride.....	March	148	Plastics combine in a functional office.....	November	133
I			Plastics engineering in 1946.....	January	137
Improved record needles molded of nylon.....	July	102	Plastics for 1947.....	January	89
Inflated vinyl goods.....	June	210	Plastics for fishing.....	April	236
Integrated plastic and rubber industries.....	September	106	Plastics help to protect transformer.....	May	119
Intercommunication sets.....	August	184	Plastics improve medical accessories.....	November	99
Is plastics' future tied to coal?.....	March	89	Plastics improve textile industry.....	July	73
L			Plastics in four home appliances.....	September	108
Laminated edge attachments for acrylics.....	September	138	Plastics in taxidermy.....	April	238
Laminated vinyl floor tiling.....	April	123	Plastics in the Douglas DC-6.....	October	90
Laminates take over interior paneling in automobiles	January	112	Plastics in the Martin airliners.....	October	94
Laminators see volume outlets ahead.....	January	95	Plastics labeling needs coordination.....	May	106
Laminates for outdoor displays.....	March	100	Plastics make good reuse packages.....	December	94
M			Plastics production statistics for 1945.....	October	124
Machine capacity on the upgrade.....	January	93	Plastics sell as well as hold cosmetics.....	December	96
Making and applying cast film.....	November	128	Plastics show threatened by division.....	September	5
Making and using thermoplastic laminates.....	February	91	Plated eyeglasses.....	July	144
Manufacture of phenolic molding compounds in Germany.....	September	160	Plywood can give new interior effects.....	December	122
Manufacture of laminates in Germany.....	October	147	Poison darts.....	October	5
Many German patents remain locked up.....	July	98	Polishing squares, flats and radii.....	November	150
Marketing pretests indicated plastics.....	December	126	Polyethylene in radio antenna tubing.....	October	196
Markets—present and future.....	May	94	Polystyrene in a non-spill desk set.....	July	104
Measuring of surface and volume resistances.....	April	151	Polystyrene makes good in refrigerators.....	June	106
Medicine uses all types of plastics.....	November	95	Polystyrene wall tile.....	May	110
Melamine soda fountain jars are useful and sanitary..	July	96	Polyurethanes.....	June	149
Merchandising of Vinyl sheeting.....	April	109	Polyvinyl acetate in powder metallurgy.....	June	196
Merry Christmas with plastics.....	December	106	Polyvinyl carbazole in Germany.....	November	157
Merchandising buyers discuss plastics.....	May	202	Portable welder that cures resin adhesives.....	May	206
Merchandising, the industry's number one problem...	May	93	Powder boxes combine styrene and acetate.....	November	132
Mesamoll plasticizers for polyvinyl chloride.....	March	154	Preheating plastics with live steam.....	February	141
Metal coated plastics.....	December	106	Prismatic designing gives brilliance to acrylic jewelry	April	128
Metal detection for better plastic products.....	April	137	Problems in promoting proprietary items.....	December	124
Metal test specimen mounted in urea.....	October	121	Production and fabricating possibilities of glass fabric reinforced plastics.....	December	142
Metal thread sealed between a acetate film.....	November	121	Program of the S.P.I. Chicago conference; listing of exhibitors, their booth numbers, exhibits and representatives at National Plastics Exposition.	May	Insert
N			Propellers from laminated wood billets.....	April	132
New acrylic contact laminate.....	October	122	Public relations.....	August	5
New beauty in clocks through plastics.....	February	108	Putting insulating properties of plastics to work....	February	134
New molding shop at research laboratory.....	September	176	Q		
New thermoset resin.....	August	226	Quality jewelry uses cast phenolic.....	August	104
New uses for nylon.....	July	148	R		
Nine plastics improve new accordions.....	August	98	Reaching the market you want with your plastic products.....	May	100
Nitrate covering for propeller blades.....	November	142	Recognition of selling.....	June	5
Non-woven cotton webs in laminates.....	September	153	R		
Nylon rope heads for new markets.....	August	121	R		
Nylon to be made from furfural.....	April	222	R		

ARTICLE	Month	Page	ARTICLE	Month	Page
Redesigning talcum containers for plastic.....	February	99	U		
Report on the flammability hearing.....	April	182	Unity.....	March	5
Resin adhesives in car bodies.....	June	174	Urea lighting fixtures.....	May	178
Resin treatment of fabric for shrink prevention, permanent starching.....	April	118	Urea tableware.....	April	226
Reviewing S.P.E.'s meeting and exhibit.....	March	102	Uses and processing of silicone rubber.....	December	102
Reviewing S.P.I. annual meeting.....	June	91	Uses for extruded vinyl.....	December	206
Ridge forming acrylic sheet.....	July	114	Uses of printed vinyl laminates.....	February	125
S			Using three dimensions of color in plastics.....	May	131
Salable qualities of vinyl upholstery.....	September	122	V		
Setting up a molding plant production schedule.....	February	150	Vacuum cleaners for home and car.....	February	106
Silverware chest molded of urea for beauty.....	February	96	Value of controls in molding.....	May	194
Sintered metal cavities.....	March	144	Vertical acting injection mold.....	October	200
Six uses for plastics in an electric brush.....	December	103	Vertical injection press.....	May	218
S.P.E. Annual technical meeting.....	February	121	Vinyl acts to preserve anatomical structures.....	December	127
S.P.I. Chicago convention.....	April	180	Vinyl butyral coated tablecloths.....	November	112
S.P.I. low-pressure division meeting.....	March	122	Vinyl covers afford maximum protection.....	May	113
S.P.I. officers for 1947-1948.....	June	80	Vinyl paste resin.....	August	108
Specimens in acrylic.....	August	178	Vinyl sheet formed into dispenser-display unit.....	August	102
Spectral transmission of transparent plastics.....	May	156	Visibility and versatility in one package.....	April	105
Spray polymerization of vinyl ethers.....	February	162	Vulcanized fibre in arc interrupting devices.....	July	88
Street lamp globes molded of polystyrene.....	May	144	W		
Stripping threaded molded closures.....	April	228	Wartime production short-cuts speed civilian goods.....	October	104
Styrene cabinet lid.....	July	164	Watch for the real competition.....	November	5
Styrene radio case.....	July	160	Water softener.....	July	152
Styrene washboard.....	April	240	West Coast S.P.I. conference.....	April	121
Sun goggles for air travelers.....	October	93	What about silicone-glass laminates?.....	May	184
T			What does plywood owe to plastics?.....	November	89
Techniques of extruding acrylic.....	December	131	What does the public know about plastics?.....	December	5
The buyer is reaching for his crown.....	February	5	What's ahead for high pressure laminates?.....	September	91
The effect of pH on the reactivity of resorcinol resins.....	August	145	What to look for in high-frequency heat sealing equipment.....	August	138
The forming and blowing of acrylics.....	November	108	Where is the low pressure industry going?.....	April	99
The plastic materials supply outlook.....	November	124	Why polystyrene tableware?.....	July	86
The position of the molder.....	January	80	Wood treatment with urea-resin-forming systems (comparison with phenolic resins for making compreg).....	February	159
The raw materials situation.....	January	101	Wood treatment with urea resin-forming systems (dimensional stability).....	October	150
The 6th John Wesley Hyatt Award.....	May	109	X		
The shower curtain problem.....	July	5	X design for transparent plastic boxes.....	April	146
The S.P.I. looks to the future.....	January	92	X-ray uses allyl resin.....	June	200
The "why" of polyethylene watch straps.....	May	120	Y		
The why and how of dyeing plastics.....	August	124	Your selling plans must be keyed to your outlets.....	May	102
Thermoplastics in tin cans.....	August	188			
There's a selling job ahead.....	January	5			
Thermoplastic rubber.....	April	126			
Thermoplastic specialty resins.....	February	100			
Thermosetting rubber-resin compounds.....	October	154			
Thermosetting silicone resins.....	December	112			
Three razors—three materials.....	September	104			
Tip molding machine.....	December	148			
Tomorrow's toy is engineered.....	February	104			
Trends in molded plastic housings.....	March	126			
Trends in the plastics industry in 1947.....	January	110			
Twelve uses for styrene in the new refrigerator.....	November	122			
Two phosphorescent polystyrene housings.....	June	184			

2 INDIVIDUAL SUBJECTS

(ab) = Abstract, (ma) = machinery, (pp) = Plastic products

ABRASION RESISTANCE	Month	Page	ACRYLIC PLASTICS (Continued)	Month	Page
A			Intercommunication unit keys.....	September	121
Comparison with hardness tests (ab).....	July	132	Kitchen and bathroom fixtures.....	June	116
Falling sand tests (ab).....	March	164	Lactoprene, properties of (ab).....	December	168
Laminates, glass-fabric (ab).....	September	166	Laminates with polyester.....	October	122
Rubber products (ab).....	August	154	Laminates with pyroxylin.....	September	192
Sandpaper tests (ab).....	March	164	Luminous murals.....	November	106
ACCUMULATORS			Manufacture of German methacrylate.....	July	129
(Greer Hydraulics) (ma).....	May	224	Molecular weight of (ab).....	May	160
ACRYLIC PLASTICS			Molecular weight and viscosity (ab).....	November	162
Accordion parts.....	August	98	Mottled acrylic sheeting.....	December	121
Allyl derivative (ab).....	October	162	Office equipment, use in.....	November	133
Annealing of.....	October	127	Optical cement, use for.....	June	141
Automobile tops.....	December	104	Perfume containers.....	July	185
Brush backs.....	April	134	Piano, parts of.....	September	119
Catalyst in (ab).....	October	162	Plating barrels.....	December	128
Clock cases.....	February	108	Radio cabinet.....	May	130
Compacts of.....	February	103, 131	Refrigerator, parts of.....	September	109
Costume jewelry.....	April	128	Ridge forming sheet.....	July	114
Die cutting.....	March	120	Scratch-resistant coatings (ab).....	April	156
Display dome.....	October	106	Specimen preservation.....	August	178
Dyeing.....	August	198	Street markers.....	November	131
Edge attachment for.....	September	138	Surgical instruments.....	November	102
Embossing method.....	August	147	Thermal expansion of.....	December	153
Expansion plans.....	January	98	Thermal polymerization (ab).....	January	164
Extruding of.....	December	131	Train interiors.....	July	80
Flowers of.....	February	130	Transmission, infrared and ultraviolet.....	May	156
Forming and blowing of.....	November	108	Ultraviolet filter.....	February	206
German manufacture.....	August	147	ADHESIVES		
Hairbrushes of.....	January	134	Acetate adhesion, with solvents (ab).....	November	160
Hat box.....	September	178	Acidity of wood joints (ab).....	April	158
Hinge.....	September	190	Advances during 1946.....	January	153
Hot straining, effect on strength (ab).....	December	172	Automobile bodies, resin-bonded.....	June	174
House numbers.....	May	214	Automobiles, use in (ab).....	November	160
Housing for saltier unit.....	May	114	Bond strength determinations (ab).....	May	162
Hotel key tags.....	June	212	Curing with portable welder.....	May	206
Injection molding powder.....	August	119	Extender for resorcinol resin.....	April	153
			Extending phenolic glue (ab).....	March	162
			Fundamentals of tackiness and adhesion (ab).....	August	152
			German developments (ab).....	April	156

ADHESIVES (Continued)	Month	Page
Impact strength (ab).....	November	164
Metal to metal (ab).....	July	134
Optical cements.....	June	141
Paper laminating (ab).....	October	160
Plywood glue (ab).....	February	166
Plywood glue lines, examination of (ab).....	October	164
Plywood glues, weathering of (ab).....	October	162
Plywood, use in.....	January	96
Plywood, thermosetting resins for (ab).....	October	160
Polyurethanes.....	June	256
Prefabricated housing, use in (ab).....	April	156
Production of, 1946.....	January	103
Protein (ab).....	March	160
Redux properties and applications (ab).....	June	154
Rubber, bonding to (ab).....	December	170
Rubber to metal (ab).....	March	160
Sandwich assembly.....	September	129
Starch adhesives (ab).....	February	166
Synthetic resin (ab).....	May	158
Synthetic resin cements (ab).....	August	160
Urea and melamine resins (ab).....	February	168
Wood moisture content, effect of (ab).....	July	132
AIR CONDITIONER		
Odac dispenser, vinyl.....	March	184
Ozonizer housing, phenolic and urea.....	February	132
Plastics for.....	September	108
AIRCRAFT		
Acrylic edge attachment (ab).....	January	164
Ball bearings for turrets, cast phenolic (pp).....	January	123
Battery, polystyrene.....	October	182
Bullet-proof fuel tank (ab).....	May	158
Design of acrylics (ab).....	June	166
Douglas DC-6.....	October	90
Edge attachments for acrylics.....	September	138
Lining for cargo plane.....	November	198
Martin airliners.....	October	94
Plastics in aircraft.....	February	121
Propellers, laminated wood.....	April	132
Propeller blades, covering for.....	November	142
Relay covers, polyester (pp).....	January	123
Rotor blades (ab).....	March	160
Wings of resin-bonded glass fabric.....	December	196
ALKYD RESINS		
Coal as source.....	March	89
Glycerol in (ab).....	September	164
Production in 1945 (S).....	October	125
ALLYL PLASTICS		
Diallyl phenyl phosphonate.....	August	226
Optical cements, use for.....	June	141
Polymerization of (ab).....	November	162
Polymerization of (ab).....	February	166
X-ray equipment.....	June	200
ANALYSIS		
Casein plastics, formaldehyde in (ab).....	October	164
Inhibitors in polymers (ab).....	December	172
Vinyl plastics, lead in (ab).....	October	164
ANNEALING		
Acrylic plastics.....	October	164
Styrene plastics.....	October	127
ASSEMBLY DEVICES		
Tinnerman Products, Inc. speed units (ma).....	November	184
AUTOMOTIVE APPLICATIONS		
Automobile, tops, acrylic.....	December	104
Bodies, resin-bonded.....	June	174
Bus bodies (ab).....	May	158
Bus windows, acrylic (ab).....	August	150
Compass housing, butyrate.....	June	216
Darrin car body of Fiberglas.....	September	110
Dealers auto tags, butyrate (pp).....	August	117
Fog lights, styrene.....	March	124
Glass fabric laminate.....	December	142
Heater buttons, styrene.....	June	216
Hydrometer, acetate.....	June	216
Laminates, use for.....	September	93
Laminates, uses in.....	January	113
Low pressure laminates for.....	April	95
Signal cord for buses (pp).....	August	118
Steering wheels and dials (ab).....	May	160
Trailers, plastics in (ab).....	December	168
Truck door take-up unit (pp).....	September	114
Upholstery for.....	September	125
Wind deflector, acrylic.....	June	216
Windows (ab).....	March	158
B		
BAR ACCESSORIES		
Beer dispenser knob, acetate (pp).....	October	115
Champagne bucket, styrene (pp).....	August	115
Coasters (pp).....	September	114
Coasters, acrylic (pp).....	January	126
Coasters acrylic (pp).....	December	116
Coasters, styrene (pp).....	November	120
Coasters, urea (pp).....	October	111
Cocktail shaker top, butyrate (pp).....	November	120
Counter and doors, phenolic laminate (pp).....	November	120
Cork decorations, styrene (pp).....	November	120
Glasses, spoons and coasters (pp).....	November	120
Jigger, styrene (pp).....	February	119
Liquor pourer, styrene (pp).....	January	124
Siphon (pp).....	September	114
Siphon head, soda water.....	October	104
Stirrers (pp).....	September	114
Tray-cocktail table, phenolic (pp).....	August	116
Tray, stainless, polyester laminate (pp).....	November	116

BARRELS	Month	Page
Head and staves, wood-phenolic.....	March	98
BATHROOM ACCESSORIES		
Faucet, all plastic.....	May	200
Fixtures, acrylic.....	June	117
Fixtures, methacrylate (pp).....	October	110
Fixtures, styrene.....	May	126
Shaving stand, acrylic (pp).....	December	120
Shower and window curtains, vinyl butyral (pp).....	January	125
Towel racks and soap dishes, acrylic (pp).....	November	117
BEAUTY PARLOR ACCESSORIES		
Applicator, hair dyeing (pp).....	September	115
Curiers, styrene (pp).....	August	118
Manicuring set, housing for.....	December	109
BEDDING		
Bed pads, vinyl (pp).....	February	117
BLOCKING RESISTANCE		
Sheets, test for (ab).....	March	164
BOATS		
Low pressure laminates for.....	April	95
Sisal-phenolic material for.....	October	202
BOOK REVIEWS		
Acétylène Homologues et Dérivés—Pierre Pigniol.....	October	180
America's Fabrics—Zelma Bendure and Gladys Pfeiffer.....	November	180
Aminoplastes—P. Talet.....	October	180
Applied Plastic Product Design—Robert L. Davis, Ronald D. Beck.....	February	186
British Catalogue of Plastics—E. Molloy.....	June	218
Chemical Engineering Catalog—Reinhold Pub. Corp.....	January	170
Chemical Specialties—H. Bennet.....	February	186
Chemistry for the Executive—Ralph K. Strong.....	March	170
Concise Chemical and Technical Dictionary—H. Bennet.....	August	202
Dictionary of Foreign Trade—Frank Henius.....	August	202
Encyclopedia of Hydrocarbon Compounds, Vol. 1, C ₁ to C ₅ —Joseph E. Faraday.....	November	180
Examination of Industrial Measurements—John W. Dudley, Jr.....	March	170
Experimental Stress Analysis—C. Lipson, W. M. Murray.....	October	180
Fundamentals of Plastics—Henry M. Richardson, J. Watson Wilson.....	March	170
German Plastics Practice—John DeBell, W. C. Goggin, W. E. Gloor.....	March	170
Handbook of Material Trade Names—O. T. Zimmerman and Irvin Lavine.....	November	180
Injection Molding of Plastics—Islyn Thomas.....	April	198
Jigs and Fixtures for Mass Production—Leland A. Bryant, Thomas A. Dickenson.....	April	198
Les Produits Resineux—R. Lombard.....	October	180
Les Resines Vinyliques—H. Gibello.....	October	180
Low-Pressure Laminating of Plastics—J. S. Hicks and R. J. Francis.....	August	202
Metallizing Non-Conductors—Samuel Wein.....	April	198
Molding and Casting—Carl Dame Clark.....	May	222
Physical Constants of Hydrocarbons—Gustav Egloff.....	October	180
Plastic Craft—Ernest S. DeWick, John H. Cooper.....	February	186
Plastics—V. E. Varsley, E. G. Couzens.....	December	188
Plastics Applied—V. E. Varsley.....	March	170
Plastics Business—Herbert R. Simonds, Joseph V. Sherman.....	June	218
Plastics Handbook for Product Engineers—John Sasso.....	January	170
Plastics in the School and Home Workshop—A. J. Lockrey.....	November	180
Plastics Mold Design—Carrol C. Sachs, Eugene H. Snyder.....	July	166
Plastics Monograph Series—Plastics Industry, London.....	July	166
Precision Hole Location for Interchangeability in Toolmaking and Production—J. Robert Moore.....	February	186
Principles of Textile Converting—Irving Teplitz.....	August	202
Protective Organic Coatings as Engineering Materials—Joseph J. Mattiello.....	May	222
Modern Organic Finishes—R. H. Wampler.....	September	182
Organic Preparations—Conrad Weygand.....	September	182
Rayon Industries of Japan—H. Wickliffe Rose.....	April	198
Textile Chemical Specialty Guide—H. R. Mauersberger.....	April	198
The Chemistry of Commercial Plastics—R. L. Wakeman.....	July	166
The Institute of the Plastics Industry, Transactions 1947.....	June	218
The Plastics Industry—Barret L. Crandall.....	November	180
The Production and Properties of Plastics—S. Leon Kaye.....	April	198
The Technology of Adhesives—John Delmonte.....	June	218
Trade-Mark Act of 1946—H. A. Toulmin, Jr.....	March	170
What Industry Owes to Chemical Science—Chem. Pub. Co.....	December	188
BOTTLE CARRIER		
Holder for, cellulose acetate (pp).....	November	117
BRISTLES		
Casein for (ab).....	June	154
BRUSHES		
Back, styrene.....	May	204
Backs for, acrylic.....	April	134
Bath brush, handle, styrene (pp).....	January	120
Bristles, nylon.....	May	204

BRUSHES (Continued)	Month	Page
Electric massaging brush.....	December	105
Hair brush bristles, vinyl (pp).....	April	114
Hairbrush, molded acrylic parts.....	January	134
Methacrylate (pp).....	September	112
BUILDING APPLICATIONS		
Floor covering, vinyl.....	August	216
Flooring and paneling.....	May	125
Folding doors, vinyl.....	December	129
Gate, laminated sections (pp).....	September	111
Jointer, styrene (pp).....	February	114
Laminated board, phenolic.....	March	105
Laminates, use in.....	September	94
Miniature sets.....	October	103
Plywood for interior decoration.....	December	122
Uses of plastics (ab).....	May	158
Wall tile, styrene.....	May	110

C

CARBOXYMETHYL CELLULOSE		
Degree of substitution (ab).....	May	162
Review of (ab).....	April	156

CASTING		
Core binders, resins for (ab).....	April	156
Gypsum resin products.....	February	121
Gypsum-urea compound.....	March	103
Heat operation in.....	November	135
Liquid phenolic casting resin.....	February	121
Processes for.....	November	153
Resins for impregnation (ab).....	October	160

CELLOPHANE		
Properties of (ab).....	September	164

CELLULOSE ACETATE		
Accordion parts.....	August	98
Boxes.....	December	94
Compounding molding powder.....	February	137
Cosmetic containers.....	December	96
Display unit.....	October	102
Dyeing.....	August	124
Expansion plans.....	January	98
Extrusion of.....	October	141
Fabricating.....	March	138
Flowers of.....	February	130
Furniture, plugs for.....	October	108
Games, molded parts.....	December	99
Goggles for air passengers.....	October	108
Housings of.....	March	126
Improved manufacturing process (ab).....	August	150
Laminates.....	February	91
Kitchen hardware.....	December	126
Manicuring set, housing for.....	December	109
Metallic yarn.....	November	121
Mesh reinforced.....	December	110
Mixed acetate ethers (ab).....	December	170
Molded microphone.....	January	133
Moth-killing attachments.....	August	98
Powder boxes of.....	November	132
Production statistics.....	June	208
Plasticizing with tri-phenyl phosphate (ab).....	October	162
Production statistics.....	July	154
Production statistics.....	May	198
Production statistics.....	April	234
Production statistics.....	August	168
Production statistics.....	February	133
Production statistics for 1946.....	March	119
Radio housing.....	March	117
Sheeting for closets.....	November	127
Statistics for 1946-47.....	January	101
Supply outlook of.....	November	124
Toy automobile of.....	April	110
Toy washing machine.....	March	117
Tractor model.....	May	116
Train interiors.....	July	80
Transmission, infrared and ultraviolet.....	May	156
Truck, toy.....	February	104
Vacuum cleaner parts.....	February	106

CELLULOSE ACETATE BUTYRATE		
Accordion parts.....	August	98
Analysis of (ab).....	December	172
Brushes of.....	December	105
Clothes wringer parts.....	August	106
Dyeing.....	August	124
Expansion plans.....	January	98
Flowers of.....	February	130
Home appliance.....	September	108
Housings of.....	March	126
Injection molding powder.....	August	120
Kitchen articles.....	September	89
Photochemical decomposition of (ab).....	November	162
Piano parts of.....	September	119
Sewing kit.....	December	190
Statistics for 1946-47.....	January	101
Vacuum cleaner parts.....	February	106

CELLULOSE NITRATE		
Accordion parts.....	August	98
Dyeing.....	August	124
Fabricating.....	March	138
Gelatinization of (ab).....	May	160
Laminate with methacrylate.....	September	192
Molecular heterogeneity (ab).....	July	132
Production statistics.....	February	133
Production statistics for 1946.....	March	119
Production statistics.....	April	234
Production statistics.....	May	198
Production statistics.....	June	208
Propeller blades, covering for.....	November	143
Statistics for 1946-47.....	January	101
Supply outlook of.....	November	124
Transmission, infrared and ultraviolet.....	May	156

CELLULOSE PHTHALATE		
Preparation of (ab).....	September	192

CELLULOSE PROPIONATE		
Advances during 1946.....	January	153
Expansion plans.....	January	98
Field performance of (ab).....	November	160
Field performance.....	January	127
Properties of.....	January	127

CHEMICAL EQUIPMENT		
Cowles, high speed dissolver (ma).....	December	192
Plastics for (ab).....	January	166

CHEMICAL RESISTANCE		
Effect of chemicals on materials (ab).....	June	136

CHEMICALS		
Acetylene, synthesis from (ab).....	July	132

CLAMP		
Aircraft tools, spring tension (ma).....	May	228

CLOCKS		
Cases, molded.....	February	108
Housing and dial, urea (pp).....	June	112

COAL TAR		
Plastics from (ab).....	October	158

COATED FABRICS		
Review of (ab).....	July	134
Water repellency (ab).....	July	134

COATINGS		
Acid increase on aging (ab).....	January	166
Aeroil Products, hot dip tank (ma).....	February	192
Aeroil Products, dipping equipment (ma).....	April	210
Alkyd oil-modified (ab).....	December	168
Alkyd resins, formulation of (ab).....	July	134
Antifouling paints (ab).....	November	160
Antifouling paints (ab).....	February	166
Butyral to metal (ab).....	March	160
Cellulosic melt compositions (ab).....	May	158
Cellulosic lacquers developments (ab).....	February	121
Chlorinated-rubber paint films (ab).....	November	160
Color by spray coating.....	November	148
Correlating accelerated and outdoor tests (ab).....	June	154
Dip-coat, vinyl.....	July	156
Dipping technique.....	February	121
Drying oil, polymerization (ab).....	October	160
Drying time, determination of (ab).....	December	168
Exterior exposure tests (ab).....	November	160
Fire resistant, antimony oxide in (ab).....	September	164
Fire resistant, vinyl resins for (ab).....	September	164
Flame-sprayed plastics (ab).....	June	154
Gel lacquer (ab).....	December	168
Heat operations in.....	November	135
Heat resistant coatings (ab).....	October	160
Imide-modified alkyds (ab).....	March	160
Lacquered containers for butter (ab).....	January	166
Metal coated plastics.....	December	106
Metal coating.....	January	142
Monomelt, spray booth (ma).....	June	226
Orthosilicates of fatty alcohols (ab).....	June	154
Paint and varnish remover (ab).....	August	150
Pigments for (ab).....	October	160
Plastics, colored for (ab).....	October	160
Polyurethane lacquers.....	June	151
Polyvinyl chloride latex.....	October	117
Preservation of plaster dies.....	April	112
Resins for nitrocellulose (ab).....	March	160
Resins for paint (ab).....	March	160
Review for 1945 (ab).....	September	164
Review of.....	February	121
Review of developments (ab).....	December	168
Ronci Machine, speed enameler (ma).....	April	206
Rubbers in paints (ab).....	May	158
Saran latex, properties of (ab).....	April	156
Silicon resins for finishes (ab).....	August	150
Styrene copolymers in (ab).....	March	160
Textile coating, vinyl.....	January	176
Vinyl, plasticizers for.....	December	163
Vinyl resin dispersions (ab).....	September	164
Vinyl resin finishes (ab).....	November	160
Viscosity of cellulosic solutions (ab).....	May	158
Viscosity of cellulose acetate (ab).....	August	150
Water immersion test (ab).....	October	160

COLD MOLDING		
Heat operations in.....	November	135

COLORING MATERIALS		
Dyeing.....	August	124
Dyeing styrene and phenolic parts (ab).....	August	150
Filing system for colors.....	May	131
Plastics, coating for.....	November	148
Statistics for 1946-47.....	January	101

COMMUNICATION EQUIPMENT		
Housing for unit, acetate and therolic.....	August	184
Intercommunication unit housing.....	September	121

COMPREG		
Fatigue tests of (ab).....	October	162
Resins for.....	February	159
Thermal expansion of.....	December	153

COMPRESSION MOLDING		
Heat operations in.....	November	135
Mold release.....	February	121
Statistics for 1941-46.....	January	93

CONTAINERS	Month	Page
Insulated pail, vinyl	July	123
Soda fountain jars, melamine	July	90
CONTROL EQUIPMENT		
Automatic temperature control, electronic (ma)	December	194
Barnes, John S., solenoids (ma)	November	186
Fosboro, electronic controller (ma)	June	224
Gordon, Claud S., temperature (ma)	October	186
Gordon, Claud S., temperature (ma)	December	196
Leeds & Northrup, temperature controller (ma)	February	192
Photoswitch (ma)	October	184
Photoswitch, photoelectric counter (ma)	March	174
Taco West, electronic controller (ma)	June	226
Temperature control of molds	June	100
Tenney Engineering, quench tank (ma)	February	192
CONVEYORS		
Island Equipment, for extruders (ma)	January	172
CORDAGE		
Clothesline, Geon coated (pp)	October	109
Clothesline, polyethylene (pp)	September	111
Nylon rope	August	121
COSMETICS		
Compact, urea (pp)	April	117
Compacts, acrylic	February	105, 131
Containers for, plastic	December	96
Dispenser for cold cream, styrene (pp)	March	111
Lipstick, methacrylate (pp)	October	111
Makeup holder, nylon	March	192
Mascara case, polystyrene (pp)	October	112
Musical powder box, acrylic (pp)	January	126
Perfume bottle cap, cast phenolic (pp)	January	120
Powder boxes, styrene and acetate	November	132
Powder sifter, vinyl (pp)	April	115
Tissue container, styrene (pp)	April	117
COSTUME JEWELRY		
Acrylic accessories	April	128
Bracelet and belt, cellulose acetate (pp)	October	111
Lapel pin, acrylic (pp)	February	118
Lapel pins, acrylic (pp)	November	118
Millinery trims, coated fiber (pp)	February	118
Novelties, acrylic (pp)	December	120
COTTON		
Laminates, cotton webs for	September	153
COVERINGS		
Vinyl caps and sleeves	October	101
CRANES		
Industrial Equipment (ma)	December	196
Lisbon Hoist and Crane, electric hoist (ma)	December	196
CREEP (See Properties)		
CUSHIONS		
Vinyl film for (pp)	October	116
CUTTING MACHINES		
Campbell Machine and Development, rubber floor tile (ma)	December	194
Circo Tool, circular cutting (ma)	June	224
Clinton Machine (ma)	July	174
Development and Design, for vinyls (ma)	May	224
D		
DECORATIVE APPLICATIONS		
Bowl, methacrylate (pp)	September	113
Cast gypsum-urea articles	March	103
Christmas decorations	December	89
Desk set, methacrylate (pp)	September	112
Diary and notebook covers, nitrate (pp)	January	126
Flower pots, acetate (pp)	May	121
Flowers, acetate and vinyl	February	130
Hand-carved figures, acrylic	June	262
Inkwell, phenolic (pp)	November	113
Lamp shades vinyl and polyesters	August	102
Luminous murals	November	106
Paper weight, acrylic (pp)	December	116
Picture frame, acetate (pp)	December	117
Plastic murals, acrylic	February	188
Printed vinyl laminates	February	123
Pull, window shade (pp)	September	118
Sculpture, furane impregnated	March	178
Tray, acrylic (pp)	February	116
Wall panelling, vinyl and polyesters	August	162
DENTAL APPLICATIONS		
Burr holder, styrene (pp)	December	114
Display piece, butyrate (pp)	February	115
DESK ACCESSORIES		
Book shelf, phenolic	July	105
Pen holder, styrene	July	104
Ruler and letter weight, ethyl cellulose (pp)	June	115
DISPLAY		
Belt, acrylic	August	196
Belt boxes, phenolic	July	194
Carstairs whiskey thermometer, acetate	August	196
Case, methacrylate (pp)	September	114
Cola bottle, acrylic (pp)	March	114
Come dispenser, acetate (pp)	March	112
Counter merchandising unit	October	102
Dome, methacrylate	October	106
Drawers for merchandise, acrylic (pp)	October	115

DISPLAY (Continued)	Month	Page
Ford model, acrylic	August	196
Garden markers, polystyrene (pp)	September	111
Hat box	September	178
Juke box housing, acrylic (pp)	August	115
Laminates for	March	100
Nail polish tray, styrene	August	196
Pen container, acrylic and butyrate	February	147
Pepsi-Cola dispenser display, vinyl	August	102
Perfume set, polystyrene (pp)	October	112
Pipe case, acetate	August	196
Popcorn machine dome, acrylic (pp)	June	114
Rack for spices, styrene	May	145
Selling plastics	May	102
Shears, acrylic (pp)	July	93
Shelving, acrylic (pp)	December	114
Signs, acrylic (pp)	February	115
Table sign (pp)	September	115
Translucent panel, melamine (pp)	December	115
Tray for screws, acetate	August	140
Window display, acetate (pp)	October	115
Window display, acrylic (pp)	November	113
DRILL PRESSES		
Chicago Brillet, instant speed changer (ma)	October	186
Commander Mfg., drilling attachment (ma)	March	176
Detroit Tap & Tool (ma)	December	194
Rayco Mfg., high speed production chuck (ma)	December	194
DRILLS		
Case for, acetate (pp)	August	117
Chicago-Latrobe Twist Drill Works (ma)	December	192
Holder for, phenolic (pp)	May	121
Matco Tool, drill jig (ma)	April	208
DRYERS		
Leiske Machine, preheater (ma)	June	224
Wyssmont, turbo (ma)	October	184
DUPLICATOR		
Housing for	December	108
E		
EDITORIALS		
A marketing model for plastics	May	
Flammability Laws	April	
Plastics show threatened by division	September	
Poison darts	October	
Public relations	August	
Recognition of selling	June	
The buyer is reaching for his crown	February	
The shower curtain problem	July	
There's a selling job ahead	January	
Unity	March	
Watch for the real competition	November	
What does the public know of plastics?	December	
ELECTRICAL APPLICATIONS		
Arc devices, vulcanized fibre	July	88
Cast resins for assemblies	July	99
Circuit breaker, phenolic (pp)	December	115
Electrolytic capacitor, acetate (pp)	June	112
Housings, phenolic (pp)	May	121
Iron, phenolic handle for	April	192
Motor bearing ring, phenolic	July	84
Plug board, phenolic (pp)	March	116
Polyethylene at high frequency (ab)	June	156
Review of (ab)	November	160
Review of (ab)	March	158
Shaver voltage equipment, urea (pp)	January	125
Toaster, phenolic parts for	April	192
Transformer alarm, melamine	May	119
Wall plug outlet, phenolic (pp)	October	111
ELECTRICAL PROPERTIES		
Humidity conditions, effect on (ab)	October	162
Photodielectric analysis	February	163
Research in 1945 (ab)	January	166
Surface and volume resistance	April	151
ELECTRONIC HEATERS		
Cost analysis in preheating	March	131
Delta Calesco (ma)	October	184
General Electric (ma)	September	184
Induction Heating Corp. (ma)	November	184
Licensing Order, FCC	August	126
Raytheon Manufacturing (ma)	September	208
Westinghouse Electric, generator (ma)	June	230
ELECTRONIC HEATING		
Advantages and Limitations (ab)	May	160
ELECTROPLATING		
Barrels for plating, acrylic	December	128
Los Angeles explosion	July	83
Method for coating plastics (ab)	January	166
Rack coatings (ab)	January	166
ETHYL CELLULOSE		
Clock cases	February	108
Dyeing	August	124
Expansion plans	January	98
Golf club heads	July	101
Hot-melt coating (ab)	February	166
Housings of	March	126
Laminates	February	91
Production of, 1946	January	103
Radio housing	March	117
Toy washing machine	March	117

EXPANDED PLASTICS

	Month	Page
Cellulose acetate, cellular (ab)	October	160
Contouring honeycomb	May	140
Developments in	April	122
Developments in 1946	January	137
Duyfaylite (ab)	December	168
Foams	February	121
Heat insulation properties (ab)	February	168
Honeycomb core for laminates	September	95
Honeycomb on Martin airliners	October	94
Honeycomb structures	September	129
Polyurethane	June	254
Properties of (ab)	November	162
Styrene foam	December	204

EXTRUSION MOLDING

Acrylic extrusion	December	131
German method	May	153
Heat operations in	November	135
Polyethylene	June	96
Process and materials	October	134
Screw design for dry extrusion	June	96
Statistics for 1941-46	January	93

F

FABRICATING PLASTICS

Acetate material for	June	95
American Emory Wheel Works, abrasive cut-off (ma)	March	178
Cellulose acetate	March	138
Contouring honeycomb	May	140
Die cutting acrylics	March	120
Forming of acrylic sheets	June	95
Forming acrylic sheet	July	115
Forming sheet material	February	121
Glass fabric laminates, assembly line for	December	142

FANS

Waldron, industrial fans (ma)	March	176
-------------------------------	-------	-----

FATIGUE STRENGTH

Melamine plastics	May	151
Phenolic plastics	May	151
Specimens, preparation of (ab)	November	164

FIBERS

Cellulose ethers, treatments of (ab)	October	158
Electrokinetic measurements (ab)	February	168
German developments of (ab)	October	158
Glass fibers in engineering (ab)	June	154
Lamb skins, resin treatment of	November	110
Plastics for (ab)	October	158
Resin treatment of	April	118
Terylene polyester (ab)	March	158

FILLERS

Walnut shell flour (ab)	June	154
-------------------------	------	-----

FILMS

High frequency sealing	June	98
Manufacture of (ab)	October	158
Manufacture of (ab)	March	158
Properties of	June	97
Vinyl chloride-acetate resin (ab)	September	164

FILTER UNIT

Injec-A-Flow Pump (ma)	November	186
------------------------	----------	-----

FINISHING

Grinding wheels for plastics (ab)	June	156
-----------------------------------	------	-----

FISHING SUPPLIES

Bait box, styrene (pp)	July	92
Casting reel, phenolic (pp)	January	121
Fly box, butyrate (pp)	March	110
Fly boxes and spools, acetate	April	236
Lure, nitrate (pp)	October	116
Minnow Buckets, polyester	August	112
Rod, cellulose acetate (pp)	July	92

FLAMMABILITY

Flash-point method (ab)	February	170
Ignition temperatures (ab)	August	152
Laminates, flameproofing	March	151
Legislation	June	98
Report on House hearing	April	182

FLASHLIGHTS

Case and head, butyrate (pp)	July	93
Molded parts, cellulosic (pp)	November	114
Molded case, ethyl cellulose (pp)	January	121
Top for, acetate (pp)	October	116

FLEXIBLE TUBING

Spiratube Div., Warner Brothers (ma)	November	186
--------------------------------------	----------	-----

FLOW PROPERTIES

Plastometer, parallel plate (ab)	October	164
Rheological systems (ab)	October	162

FOLDING MACHINE

Taber Instrument, plastic sheeting (ma)	October	186
-----------------------------------------	---------	-----

FUNGUS RESISTANCE

Fungicides for vinyls (ab)	June	154
----------------------------	------	-----

FURFURAL

Nylon made from	April	222
-----------------	-------	-----

FURNACES

Huppert, K. H., laboratory (ma)	May	228
Huppert, K. H., tool treating (ma)	October	184

FURNITURE

Card table top, phenolic	June	120
Casters, butyrate (pp)	January	124
Chair scuff plates, phenolic (pp)	October	115
Chairs, plastic upholstered (pp)	October	109
Chair webbing, nylon (pp)	June	113
Coffee table, urea bonded plywood (pp)	December	117
Couch upholstery, vinyl (pp)	February	116
Desk, molded plywood	February	103
Fabric covering for, vinyl (pp)	February	117
Laminates, plywood and acrylic (ab)	August	150
Plugs for, cellulose acetate	October	108
Plywood, resin-bonded	April	188
Table, acrylic	March	178
Table tops, laminated	February	152
Upholstery for	September	124
Waterproof covers, vinyl (pp)	July	94

FURS

Lamb skins, resin treatment of	November	110
--------------------------------	----------	-----

G

GAGES

Branson Instruments, thickness gage (ma)	February	192
Cap and bottle, phenolic laminate (pp)	August	118
Dillon, W. C., mechanical pressure (ma)	January	174

GAMES

(See Toys)

GARDEN ACCESSORIES

Sprayer, acetate (pp)	June	114
-----------------------	------	-----

GLOVES

Mitten liner, vinyl (pp)	December	115
Work gloves, vinyl butyrate (pp)	November	114

GOGGLES

Cellulose acetate	October	93
Parts for, cellulosic and vinyl (pp)	November	114

GRINDERS

Cincinnati Milling Machine (ma)	October	184
Oliver Instrument, tool and cutter (ma)	January	174
Porter-Cable Machine, belt attachment (ma)	September	208
Porter-Cable Machine, centerless wet belt (ma)	May	226
Porter-Cable, utility (ma)	July	174
Vulcan Tool, air-driven attachment (ma)	May	224
Wheels	May	216
Woods Engineering, belt sander (ma)	February	190
Wyzenbeek & Staff (ma)	September	184

H

HANDBAGS

Assembly of	November	104
Children's purses, acetate (pp)	October	114
Frame and handles, cellulose acetate (pp)	November	118
Frames for, acetate (pp)	December	119
Frames for, acrylic (pp)	April	115
Hat and bag, plastic-coated fiber (pp)	January	120

HANDLING PLASTICS

Market Forge, skid platform (ma)	March	176
----------------------------------	-------	-----

HARDWARE

Kitchen fixtures, acetate and styrene	December	126
Scissors, phenolic housing (pp)	July	94

HEATING EQUIPMENT

(See Electronic Heater)

Castaloy, heating unit (ma)	June	228
Equipment and methods for	November	135
Improved Paper Machinery Corp. (ma)	November	184
Livingstone, boilers (ma)	February	194
Preheating, electronic	March	131
Youngstown Miller, jacket oil heaters (ma)	October	186

HEAT SEALERS

Cleveland Lathe & Machine (ma)	December	192
Equipment analysis	August	138
Pack-Rite Machines, conveyor (ma)	February	190
Radio Corporation of America (ma)	July	172
Strength of bond, test for (ab)	December	170

HINGES

Canu, spring (ma)	August	212
Norton Laboratories (ma)	September	184
Transparent plastics	September	190

HONEYCOMB MATERIALS

(See Expanded Plastics)

HOSIERY

Case for, laminate (pp)	November	114
-------------------------	----------	-----

HOUSINGS

Business machines	March	126
Coffee-tea unit, phenolic	June	109
Control housing, phenolic	April	190
Model plane control, phenolic (pp)	April	116
Phosphorescent styrene	June	184
Salter unit, acrylic	May	114
Water softener, melamine	July	152

HYDRAULIC EQUIPMENT

	Month	Page
Aldrich Pump (ma)	February	192
Elmes Engineering Works (ma)	January	172
Gerotor May, hydraulic pump (ma)	March	176
Lyon-Raymond, power unit (ma)	January	172
Perkins, B. F. & Son, Inc. (ma)	November	184
Perkins, B. F. & Son, Inc. (ma)	January	174
Superdraulic, pump (ma)	March	174

I

IMPACT STRENGTH

Equipment for (ab)	September	168
Relation to flexural strength (ab)	October	162
Significance in design (ab)	December	170

INFRARED EQUIPMENT

AC-CO, dryer-preheater (ma)	August	210
Miskella Infra-Red, portable unit (ma)	September	210
Miskella Infra-Red, bench kit (ma)	October	184
Miskella Infra-Red (ma)	January	176

INJECTION MOLDING

De Mattia Machine (ma)	July	176
Giddings and Lewis, press	May	218
Hand operated machine	July	117
Heat operation in	November	135
Large parts, molding of	June	100
Mold for, vertical acting	October	200
Statistics for 1941-46	January	93
Thermosetting materials	May	135

INSERTS

The Dodge Mfg., expanding insert (ma)	July	172
---------------------------------------	------	-----

INSTRUMENTS

Dial illumination, acrylic	July	184
Navigator, phenolic	May	139
Navigators protractor, nitrate (pp)	February	115
Pyrometer Service, Temperature testing (ma)	February	192
Synchrotron, polyester laminated parts	July	91

ION EXCHANGE RESIN

Copper determination (ab)	September	168
---------------------------	-----------	-----

K

KITCHEN ARTICLES

Bowls, polyethylene (pp)	January	124
Bowls, polyethylene (pp)	June	112
Bread bag, vinyl (pp)	November	117
Bread knife, styrene (pp)	November	116
Churn handles, phenolic (pp)	February	116
Cleaver handles, butyrate, ethyl cellulose (pp)	July	92
Dish drainer, vinyl (pp)	July	92
Egg container, styrene (pp)	November	116
Fixtures, acrylic	June	117
Food container, acetate and ethyl cellulose (pp)	March	116
Fruit juicer	September	99
Funnel (pp)	September	118
Handle (pp)	September	118
High-frequency cooker	February	134
Ice cream scoop, ethyl cellulose (pp)	August	115
Ice crusher	September	99
Ketchup dispenser, styrene (pp)	July	95
Knife handles, acetate (pp)	May	123
Knife sharpener, acetate (pp)	December	118
Knife sharpener, butyrate	April	194
Lid for jars, acetate (pp)	March	112
Mixer, styrene (pp)	December	119
Percolator handles, phenolic	February	134
Sink strainer (pp)	September	118
Table crumber, urea phenolic (pp)	December	118

L

LABELING

Advantages of informative labeling	June	99
Informative	May	106

LAMINATES

Abrasion (ab)	September	166
Accordion parts	August	98
Acrylic and polyester combination	October	122
Airplane propellers, phenolic	April	132
Arc interrupter devices	July	88
Automobile interiors	January	113
Building boards, phenolic	March	105
Commutator insulation (ab)	May	158
Cotton webs for	September	155
Display bases for (ab)	March	100
Engineering materials	February	121
Fabric bases for (ab)	March	162
Flameproofing of	March	151
German products	October	147
Glass fabrics, fabricating	December	142
Lignin laminates, Canadian	April	106
Low pressure, continuous	April	95
Low pressure laminating	March	122
Molded laminated products	February	121
New developments in	January	95
Office equipment, use in	November	133
Plates on planers	March	97
Printed vinyls	February	125
Production of high pressure laminates	September	91
Radio case	August	170
Refrigerators, use in	September	109
Silicone-glass laminates	May	184
Synchrotron parts, polyester	July	91
Tension and creep properties (ab)	April	158
Textile machinery	July	73

LAMINATES (Continued)

	Month	Page
Thermoplastic, development of	April	122
Thermoplastic laminates	February	91
Tools of	June	132
Train interiors	July	80

LAMINATING

Equipment for	October	148
Heat operations in	November	138
Low pressure	February	121
Low pressure, cost analysis of	April	122
Resin for low-pressure laminating (ab)	October	158

LAMPS

Finials, styrene and acetate (pp)	December	116
Fluorescent diffusers, butyrate (pp)	June	112
Globes, styrene	May	144
Shade, polyester glass-fabric	October	100
Shade, polystyrene	November	194
Urea lighting fixtures	May	178

LATHES

Beach Machine Works, chamfering machine (ma)	April	204
General Die & Stamping, lever-type drawbar (ma)	June	230
Hammond Machinery, polishing and buffing (ma)	April	204
Hardinge Brothers, chucking machine (ma)	April	206
Hardinge Brothers, lathe collet stop (ma)	December	194
Hochman, Ralph, polishing (ma)	July	178
Monarch Machine Tool, air-tracer (ma)	March	174
Precise Products, variable speed (ma)	October	184
South Bend Lathe Works, grinding attachment (ma)	April	204
South Bend Lathe Works, hand lever turret (ma)	December	192

LAUNDRY DEVICES

Clothes wringer parts, butyrate	August	106
Ironer parts, phenolic	August	107
Iron handle, phenolics (pp)	November	116
Stocking drier, cast phenolic (pp)	November	117
Washboard, styrene	April	240

LAWN MOWER

Grips and roller, butyrate (pp)	November	117
---------------------------------	----------	-----

LEATHER

Resin made from (ab)	October	158
----------------------	---------	-----

LIGHTING

Christmas lights	December	90
Fluorescent light fixture	February	102
Fluorescent tube shade, acetate (pp)	August	118
Lamp shades, polyester	February	98, 194
Lantern, cellulose housing for	October	204

LIGNIN PLASTICS

Canadian molding powder	April	106
Review of (ab)	June	154

LOW PRESSURE PLASTICS

Market economics of	June	102
---------------------	------	-----

M

MACHINERY

Foredom Electric, shaft machine kits (ma)	August	210
Goodrich, speed selector (ma)	June	224
Oilgear, variable speed transmission (ma)	August	205
Textile manufacture	July	73
Trico Fuse Mfg., all-purpose clamp (ma)	August	210

MAGNETS

Preparation from metal and resin (ab)	February	166
---------------------------------------	----------	-----

MAILBOX

Methacrylate box (pp)	October	110
-----------------------	---------	-----

MARKING DEVICES

Acromark, bench type (ma)	October	186
Acromark, stamping machine (ma)	January	174
Electric marker, butyrate (pp)	September	115
Gottsch, Adolph (ma)	October	186
House numbers, acrylic	May	214
Mathews, James H. (ma)	December	192
National Rubber Stamp (ma)	July	172
Price markers, vinyl (pp)	November	113
Stamp, laminated wheels (pp)	September	115
Street markers	November	131

MATERIAL HANDLING UNIT

American Machine & Foundry (ma)	September	208
California Pallet, truck (ma)	May	226

MATERIALS

Developments in (ab)	June	154
Supplies for compression molding	June	94

MEDICAL APPLICATIONS

Artificial eyes, acrylic (ab)	June	154
Cold pack, vinyl	March	172
Douche-enema bag, vinyl (pp)	May	122
Dry ice applicator, acrylic	August	194
Hospital uses of plastics	November	99
Massager housing, phenolic	July	146
Measuring spoon, styrene (pp)	February	114
Nurses' caps, plastics-coated (pp)	March	113
Oxygen tent	November	95
Resuscitator	November	95
Specimen preservation, acrylic	August	178
Specimen preservation, polyester (ab)	March	160
Specimen preservation with vinyl	December	127
Suppository mold, acrylic (pp)	March	112

PACKAGING (Continued)	Month	Page	PHENOLIC PLASTICS (Continued)	Month	Page
Drop test (ab).....	May	162	Laminates, flameproofing.....	March	151
Films, use for (ab).....	March	160	Laminates, German.....	October	147
Frozen food wrappers (ab).....	July	134	Liquid resins, properties (ab).....	May	158
Hat box, vinyl (pp).....	February	118	Massager housing.....	July	146
Labeler for bottles (ab).....	December	168	Mechanical properties of (ab).....	April	158
Labeling machine.....	February	204	Medical uses of.....	November	95
Labels, acetate (pp).....	January	122	Navigator instrument.....	May	139
Laminated labels (ab).....	July	134	Packaging base of.....	April	105
Moisture equilibrium (ab).....	May	162	Paper, resin-impregnated surfacing.....	October	97
Oil can, acetate (pp).....	April	117	Percolator handles.....	February	134
Outlook of (ab).....	May	158	Phenols for (ab).....	March	158
Paper, polyethylene coated (ab).....	September	164	Photographic tank.....	August	166
Perfume containers, acrylic.....	July	85	Plywood adhesive, use as.....	November	89
Perfume container, acrylic and polyethylene (pp).....	February	118	Poker table.....	February	112
Perfume holder, acrylic (pp).....	January	122	Preheating with live steam.....	February	141
Plastic coated wire.....	April	186	Preparation, German method.....	May	153
Polyethylene, use in (ab).....	April	156	Printing plates.....	August	174
Selling plastics.....	May	102	Production in 1945.....	October	125
Silverware chest.....	February	97	Production statistics.....	February	133
Specialty papers, plastic coated (ab).....	February	168	Production statistics.....	April	234
Strip coatings for metal (ab).....	September	164	Production statistics.....	May	198
Styrene tool boxes (ab).....	July	134	Production statistics.....	August	168
Talcum container, styrene.....	February	99	Production statistics.....	June	208
Tin can gasket.....	August	188	Production statistics.....	July	154
Tool boxes, styrene.....	February	127	Production statistics for 1946.....	March	119
Transparent boxes.....	April	146	Properties of.....	February	121
Transparent box manufacture.....	June	123	Radio control unit.....	February	208
Transparent containers (ab).....	June	156	Radio housing.....	February	128
Transparent sheets for (ab).....	August	150	Radio housing, cast.....	March	117
Vinyl sheet for.....	February	126	Razors.....	October	196
Watch case, acetate (pp).....	February	119	Resin-bonded plywood.....	September	104
PAINT			Rubber compounded with.....	July	123
(See Coatings)			Siphon head.....	October	154
PAPER			Statistics for 1946.....	October	104
Surfacing laminates, resin-impregnated for.....	October	97	Supply outlook of.....	January	103
Wet strength, resins for (ab).....	September	164	Synthetic rubber, compounding with (ab).....	November	124
PARKING METERS			Textile machinery.....	December	172
Windows for, acrylic (pp).....	May	123	Thermal expansion of.....	July	73
PEN AND PENCILS			Toy automobiles of.....	December	153
Ink reservoir, polyethylene (pp).....	August	115	Use in making compreg.....	April	110
Lead container, acetate (pp).....	August	116	Transmission, infrared and ultraviolet.....	May	156
PERMEABILITY			Vacuum cleaner parts.....	February	159
Gas, determination of (ab).....	March	162	Valve for liquids.....	February	106
Gas, relation to microstructure (ab).....	February	168	PHONOGRAPH APPLICATIONS		
Gas, standard method (ab).....	February	170	Record needle shaft, nylon.....	July	102
Mechanism of (ab).....	June	156	Records, vinyl.....	July	107
Oxygen through films (ab).....	September	168	PHOTOGRAPHY		
Packaging materials for vegetables (ab).....	December	172	Enlarging easel, phenolic (pp).....	June	113
Water-vapor permeability test at 0° F. (ab).....	December	170	Projector, acrylic, urea and phenolic parts.....	January	118
Water vapor, temperature dependence (ab).....	October	162	Tank, phenolic.....	August	166
Water vapor, test for (ab).....	March	164	Tray, phenolic (pp).....	October	116
Water-vapor transmission (ab).....	February	170	Viewer, three dimensional, acetate (pp).....	September	116
Water-vapor at 100° F. (ab).....	February	170	PLASTICIZERS		
PERSONAL ACCESSORIES			Cellulose nitrate (ab).....	October	160
Beauty patter housing, acetate (pp).....	June	114	Crystallization of (ab).....	November	164
Belt, acetate, polyethylene and vinyl (pp).....	July	95	Developments in (ab).....	March	160
Garment presser, phenolic (pp).....	March	116	Diallyl phthalate for vinyls.....	April	127
Hair ornaments.....	May	212	Dielectric identity test (ab).....	April	160
Handkerchief and glove boxes, styrene (pp).....	May	120	Ether esters for vinyl.....	December	163
Hat cover, vinyl (pp).....	February	120	Gelation, effect on (ab).....	April	160
Loop holders, acetate (pp).....	April	114	Petroleum derivative.....	October	198
Pencil set, acrylic (pp).....	May	122	Production in 1945.....	October	124
Razor handle, ethyl cellulose.....	February	120	Statistics for 1946-47.....	January	108
Shaver case, styrene (pp).....	February	120	Vinyl paste.....	August	108
Suit bag, vinyl (pp).....	February	120	Vinyl plastics, Mesamoll.....	March	154
Tie rack, styrene (pp).....	January	121	PLASTICS INDUSTRY		
Toilet kit, cellulose nitrate (pp).....	December	120	Advances in 1946.....	January	153
Tooth brush and holder (pp).....	June	115	British, review of (ab).....	March	158
Watch strap, polyethylene.....	May	129	Business prospectus for 1947.....	April	122
PETROLEUM			Canadian lignin plastics.....	April	106
Plasticizer derived from.....	October	198	Coal as source.....	March	89
Sources of plastics.....	March	80	Consumer education through advertising.....	April	121
Sulfur polymers from (ab).....	May	158	Cost accounting.....	June	104
PHENOLIC PLASTICS			Department stores wants.....	April	121
Accordion parts.....	August	98	Developments in India (ab).....	June	154
Airplane propellers.....	April	132	Exports, growth of (ab).....	April	156
Barrel head and staves.....	March	98	German patents.....	July	98
Bearing adapter ring.....	July	84	Labeling, informative.....	May	106
Benzol from coal.....	March	89	Low pressure, economics of.....	April	95
Boat of impregnated sisal.....	October	202	Markets for.....	May	100
Brushes of.....	December	105	Markets, present and future.....	May	94
Building board, laminated.....	March	105	Materials picture for 1947.....	April	121
Card table tops.....	June	120	Merchandising problems.....	May	93
Casting, centrifugal (ab).....	October	160	Plastics exposition.....	June	90
Casting of.....	November	153	Plastics merchandising.....	April	121
Cast resins.....	February	121	Production efficiency.....	May	98
Clack cases.....	February	108	Production statistics.....	May	198
Condensation reaction (ab).....	February	168	Production statistics.....	June	208
Cosmetic containers.....	December	96	Production statistics.....	July	154
Crimp, tensile, fatigue properties.....	May	151	Quality consumer items.....	April	121
Decorative uses.....	May	125	Standardization.....	February	121
Desk tray.....	October	206	Standardization of plastics (ab).....	August	152
Dielectric properties (ab).....	May	160	Trends in 1947.....	January	110
Display unit.....	October	102	PLYWOOD		
Dyeing.....	August	124	Barrel head and staves.....	March	98
Expansion plans.....	January	98	Barrels of (ab).....	February	166
Games, cast and molded.....	December	99	Desk, molded.....	February	103
German manufacture of.....	April	154	Effect of pH on strength.....	July	123
German molding compounds.....	September	160	Furniture, resin-bonded.....	April	188
Glass laminates.....	May	186	Interior decorating with.....	December	122
High frequency cooker.....	February	134	New developments in.....	January	96
House appliances.....	September	108	Resins for bonding.....	November	89
Housing for coffee-tea unit.....	June	109	Surfacing with resin-impregnated paper.....	October	97
Housings of.....	March	126	POLISHING		
Injection molding.....	May	135	Acrylic, buffing compound.....	January	188
Intercommunications unit housing.....	September	121	Hammond Machinery Builders, buffing lathe (ma).....	March	178
Ironer parts.....	August	107	Method for squares, flats and radii.....	November	150

POLYESTERS	Month	Page	PRESSES (Continued)	Month	Page
Allyl derivatives (ab).....	April	156	Wood, R. D. (ma).....	September	208
Allyl maleic anhydride copolymer.....	December	170	Wood, R. D., embossing (ma).....	June	230
Boat model.....	February	110	Wood, R. D., self-contained plates (ma).....	October	186
Catalysts, effect on castings.....	February	121	Wroble Engineering, hydraulic (ma).....	June	228
Developments in.....	April	122			
Display figures.....	March	100	PRINTER		
Hallow thermosetting products.....	April	143	Gottscho, Adolph, Markomatic industrial (ma).....	September	208
Laminates, flameproofing.....	March	151			
Laminates for tools.....	June	132	PRINTING		
Lamp shade, impregnated glass fabric.....	October	100	Film, acetate (pp).....	February	115
Lamp shades.....	February	98, 194	Plastic printing plates (ab).....	November	160
Low pressure laminating.....	March	122	Plates, cast phenolic.....	August	174
Synchrotron parts, laminated.....	July	91	Resins for inks (ab).....	March	160
Synthetic fiber (ab).....	February	166			
Transmission, infrared and ultraviolet.....	May	156	PROPERTIES		
X-ray equipment.....	June	200	(See also Particular Property)		
			Creep, melamine and phenolics.....	May	157
POLYETHYLENE			Creep (ab).....	May	160, 162
Chlorotrifluoroethylene (ab).....	July	134	Flow (ab).....	May	160
Expansion of.....	October	141	Greaseproofness (ab).....	August	154
Expansion plans.....	January	98	Lignin laminate.....	April	108
Fabric woven from.....	November	107	Mechanical tests (ab).....	April	160
Packaging, use in (ab).....	January	166	Moisture content of fibers (ab).....	May	162
Radio antenna tubing.....	October	196	Review of (ab).....	November	160
Review of (ab).....	February	166	Tensile and fatigue strength (ab).....	May	160
Review of (ab).....	April	156			
Watch straps.....	May	129	PROPRIETARY ITEMS		
			Problems in marketing.....	December	124
POLYETHYLENE GLYCOLS					
Quantitative determination of (ab).....	April	160	PROSTHETIC DEVICES		
			Plastics for (ab).....	October	158
POLYISOBUTYLENE			Vinyl materials (ab).....	February	166
Catalysts for polymerization (ab).....	August	152			
Molecular weight of (ab).....	October	164	PROTEIN PLASTICS		
			Applications, review of (ab).....	September	164
POLYMERIZATION			Fatty acid derivatives (ab).....	March	158
Copolymerization (ab).....	November	162	Fibrin film from plasma (ab).....	March	158
Copolymerization, component distribution (ab).....	January	164			
Hydrocarbons, low-temperature polymerization (ab).....	April	158	PUMPS		
Inhibitors of (ab).....	September	166	Delta Manufacturing Div., coolant pump (ma).....	December	194
Olefins (ab).....	September	166	Dry air, acrylic.....	April	242
Oxygen as activator and deactivator.....	December	158	Gerotor May, hydraulic (ma).....	June	224
Reactivities of vinyl monomers (ab).....	August	152	Milton Roy, stroke adjustment (ma).....	April	210
Spray method.....	February	162	Superdual Corp. (ma).....	December	194
Styrene (ab).....	September	166			
Styrene copolymers (ab).....	September	166	PYROMETER		
Vinyl acetate (ab).....	September	166	Wheelco Instruments, portable (ma).....	September	210
POLYMERS			Q		
Decomposition by ultrasonic waves (ab).....	April	158	QUALITY CONTROL		
Density gradient (ab).....	November	164	Specifications, application in (ab).....	March	161
Fractionation of (ab).....	August	152			
Light scattering investigation of (ab).....	January	164	R		
Molecular weight distribution (ab).....	November	164	RADIO EQUIPMENT		
Phase separation in solutions (ab).....	August	152	Cabinet, acrylic.....	May	130
Size and shape of molecules (ab).....	December	172	Cabinet, ethyl cellulose (pp).....	September	112
Specific refractivity of (ab).....	December	172	Case, styrene.....	July	160
			Clock-radio, urea (pp).....	May	123
POLYSTYRENE			Control unit, phenolic.....	February	208
(See Styrene Plastics)			Dispatch board, acetate and acrylic (pp).....	August	117
POLYTETRAFLUOROETHYLENE			Housing, ethyl cellulose, styrene and phenolic.....	March	117
Advances during 1946.....	January	153	Housing, phenolic and styrene (pp).....	March	100
Properties of (ab).....	November	160	Housing, veneer-kraft laminate.....	August	170
Properties of (ab).....	January	166	Housing and handle, urea.....	January	118
Properties of.....	February	121	Housing, cast phenolic.....	October	96
Synthesis (ab).....	August	150	Housing for, cast phenolic.....	December	113
			Housing for, phenolic.....	February	128
POLYURETHANES			Insulator, acrylic (pp).....	January	123
Review of.....	June	149	Machine for fast assembly.....	August	180
			Microphone housing, urea (pp).....	August	117
POULTRY INDUSTRY			Microphone, cellulose acetate (pp).....	January	133
Belts for wastes, plastic (pp).....	October	113	Plastics for.....	September	108
			Polyethylene antenna tubing.....	October	196
POWDER METALLURGY					
Vinyl acetate, use in.....	June	196	RAILWAY APPLICATIONS		
			Plastics for train interiors.....	July	80
PREHEATING					
Steam, use for.....	February	141	RAZORS		
Thermoplastic material for injection.....	June	101	Materials for.....	September	104
PRESSES			RECORDER CONTROLLER		
Air-Hydraulics, hydraulic press (ma).....	March	174	Tagliabue Div., Portable Products (ma).....	September	208
Baldwin Locomotive, plunger molding (ma).....	July	176			
Crown Machine and Tool, injection molding (ma).....	January	172	REFRIGERATORS		
Dension Engineering (ma).....	July	172	Coating for, vinyl (pp).....	August	117
Fellows Gear Shaper, molding (ma).....	August	208	Dividers for ice trays, butyrate (pp).....	January	125
Hanfin, standard hydraulic cylinders (ma).....	June	226	Ice cube tray, polyester (pp).....	July	93
Hulbery Engineering, beader (ma).....	February	194	Light socket, vinyl (pp).....	July	93
Hydraulic machinery, injection molding (ma).....	December	192	Plastics for.....	September	108
Hydraulic Press Mfg., injection machine (ma).....	April	208	Polystyrene parts.....	June	107
Indiana Foundry, Machine & Supply (ma).....	November	184	Plug connection, styrene.....	July	93
Ketchpel Engineering, power press (ma).....	January	176	Shelf support, acetate.....	July	162
Kuz, preform press.....	June	204	Styrene plastics in.....	November	122
Laboratory press.....	January	146			
Laboratory Specialties (ma).....	February	192	RESORCINOL		
Lake Erie, multiple-unit molding (ma).....	August	212	Corn gluten extender for.....	April	153
M. & N. Machine Tool, hydraulic press (ma).....	March	176	Effect of pH on.....	August	145
Miskella Infra-Red, spiral hopper feeder (ma).....	July	178	Resin-bonded plywood.....	July	123
Munton Mfg., injection molding (ma).....	April	210			
Northern Tool and Machine, metal forming (ma).....	August	208	RUBBER AND RUBBERLIKE PLASTICS		
Pedlow Machine, plunger molding (ma).....	February	192	(See Synthetic Rubber)		
Plastic Laminating Corp., Hydraulic (ma).....	July	172	RUBBER DERIVATIVES		
Pomona Machine Works (ma).....	October	184	Oxygen tent canopy.....	November	95
Statistics.....	January	94			
Studebaker Machine, arbor (ma).....	January	174			
Superdual, relief valve (ma).....	May	226			
Watson-Stillman (ma).....	September	184			
Watson-Stillman, hinged top record and hobbing (ma).....	October	186			
Watson-Stillman, Vertical injection (ma).....	August	208			
What molders think.....	June	101			

S	Month	Page
SAFETY		
Dust explosion prevention (ab).....	November	162
Fire hazards (ab).....	November	162
HANDERS		
Barron Tool (ma).....	May	224
Sand-O-Flex, heavy-duty contour (ma).....	April	210
SANDWICH CONSTRUCTION		
Metalite, structural uses of (ab).....	December	170
SAWING		
DoALL, bench machine (ma).....	May	228
Friction cutting.....	August	135
Vinyl plastics.....	March	148
SAWS		
Flexsaw Mfg., bench saw (ma).....	December	194
Livingstone Mfg., hand saw (ma).....	March	178
SCREENING		
Polyvinylidene chloride filaments.....	August	89
SEWING KIT		
Tray, butyrate.....	December	190
SHELLAC		
Ethers, preparation of (ab).....	October	158
SHOES		
Case for, vinyl (pp).....	September	113
Heel covering.....	March	138
Back for, wood-urea (pp).....	March	111
Sandals, vinyl (pp).....	February	119
Soles and heels, styrene (pp).....	December	120
Soles for, vinyl.....	March	156
SIGNS		
(See Displays)		
SILICON POLYMERS		
Dielectric constants of (ab).....	April	158
Dipole moments of (ab).....	December	172
Ethyl silicate, properties of (ab).....	December	168
Gasketing of silicone rubber (ab).....	December	168
Elast laminates.....	May	184
History and properties of (ab).....	August	150
Insulation, use for (ab).....	November	160
Laminates, use in.....	September	97
Osmotic pressure measurements (ab).....	February	168
Polymethylsiloxanes, preparation of (ab).....	September	164
Properties and applications of (ab).....	November	160
Properties of DC 2103.....	December	112
Review of (ab).....	October	158
Review of (ab).....	February	166
Review of (ab).....	April	156
Silicone rubber, uses of.....	December	102
Viscosity of (ab).....	June	156
SMOKING ACCESSORIES		
Ash tray, cast phenolic (pp).....	September	112
Ash trays, phenolic (pp).....	December	115
Case for pipe cleaner, styrene (pp).....	January	121
Cigarette box, acrylic (pp).....	March	113
Cigarette box, methacrylate (pp).....	October	109
Cigarette case, acetate (pp).....	December	119
Cigarette case, cellulose acetate (pp).....	November	119
Cigarette case, cellulose acetate (pp).....	September	113
Cigarette case, methacrylate (pp).....	October	112
Cigarette container, styrene (pp).....	December	117
Cigar tips, acetate.....	March	111
Pipe holder, methacrylate (pp).....	September	113
SOCIETIES		
P.M.M.A. annual meeting.....	February	200
P.M.M.A. objectives.....	April	121
S.P.E. annual meeting reports.....	February	121
S.P.E. meeting and exhibit.....	March	102
S.P.E. program for convention.....	January	186
S.P.E. Western New England Section.....	September	194
S.P.I. annual meeting.....	June	91
S.P.I. Canadian conference.....	April	178
S.P.I. Chicago convention.....	April	180
S.P.I. film committee.....	June	97
S.P.I. looks to the future.....	January	92
S.P.I. low-pressure meeting.....	March	122
S.P.I. midwest chapter meeting.....	May	202
S.P.I. officers.....	June	89
S.P.I. West Coast conference.....	April	121
SOIL STABILIZATION		
Resin for (ab).....	September	164
SPECIFICATIONS		
Business machine field.....	February	121
STARCH		
Allyl ethers of (ab).....	October	158
STATISTICS		
Compression machines.....	January	93
Extrusion machines.....	January	93
Injection machines.....	January	93
Materials expansion plans.....	January	98
Molded products, 1946-47.....	January	89
Plastic materials, 1946-47.....	January	101
Plastics production.....	April	234
Plastics production for 1946.....	March	119
Plastics production.....	February	133
Plywood glue, 1946.....	January	96
Production in 1946.....	October	124

	Month	Page
STYRENE PLASTICS		
Accordion parts.....	August	98
Alkyl styrenes, preparation of (ab).....	September	164
Annealing of.....	October	127
Automobile fog light.....	March	124
Bathroom fixtures.....	May	126
Battery container.....	October	182
Boxes.....	December	94
Cast resin for electrical uses.....	July	99
Cast Textolite 1422.....	October	120
Christmas decorations.....	December	90
Clock case.....	February	108
Coal as source.....	March	89
Copolymer with acrylonitrile (ab).....	July	132
Copolymer with itaconic acid (ab).....	July	132
Cover displays, transparent.....	April	105
Dimethylstyrenes, preparation of (ab).....	September	164
Expansion plans.....	January	98
Foamed product.....	December	204
Games, molded parts.....	December	99
Harmonica.....	May	194
Heat resistant molding material.....	August	127
High-frequency dielectrics (ab).....	February	166
Home appliances.....	September	108
Ice cream cabinet.....	July	164
Kitchen articles.....	September	99
Kitchen hardware.....	December	126
Lamp globes.....	May	144
Pen holder.....	July	104
Polymerization of (ab).....	May	160
Powder boxes of.....	November	132
Production in 1945.....	October	125
Production statistics.....	February	133
Production statistics for 1946.....	March	119
Production statistics.....	April	234
Production statistics.....	May	198
Production statistics.....	June	208
Production statistics.....	July	154
Production statistics.....	August	168
Radio case.....	July	160
Radio housing.....	March	117
Razors.....	September	104
Refrigerator parts.....	June	106
Refrigerators, uses in.....	November	132
Statistics for 1946.....	January	103
Supply outlook of.....	November	124
Synthesis of styrene (ab).....	April	158
Tableware.....	July	86
Talcum container.....	February	99
Thermal expansion of.....	December	153
Tool boxes.....	February	127
Toy washing machine.....	March	117
Transmission, infrared and ultraviolet.....	May	156
Vacuum cleaner parts.....	February	106
Wall tiles.....	May	110
SURFACE ANALYZER		
Brush Development (ma).....	September	184
SYNTHETIC FIBERS		
<i>(See Fibers)</i>		
SYNTHETIC RESINS		
Production and supply (ab).....	May	158
Production of, 1939-46.....	January	102
SYNTHETIC RUBBER (See Elastomers)		
Adhesion to tire cords (ab).....	December	172
Alkylphenol tackifiers (ab).....	January	164
Anhydride rubber (ab).....	November	164
Butadiene-styrene, preparation of (ab).....	March	164
Butyl Inner tubes (ab).....	April	160
Composition of emulsion polymers (ab).....	December	172
Copolymer composition, variation of (ab).....	April	160
Copolymer resins.....	February	100
Copolymers, preparation of (ab).....	March	164
Creep of neoprene in shear (ab).....	September	168
Cyclized rubbers.....	February	100
Determination of polystyrene (ab).....	January	164
Electrostatic and tensile properties of (ab).....	November	164
Emulsion polymerization of dienes (ab).....	April	160
Fatigue strength (ab).....	November	164
Filler content, determination of (ab).....	December	172
German mechanical goods (ab).....	October	166
German research (ab).....	September	168
Hard rubbers (ab).....	February	170
High-frequency heating of (ab).....	October	166
High-frequency vulcanization of (ab).....	October	166
Improved processing GR-S (ab).....	March	164
Infrared examination of (ab).....	October	166
Isoprene derivatives (ab).....	March	164
Latex.....	January	130
Lignin reinforcement (ab).....	July	132
Magnetic anisotropy (ab).....	November	164
Mercaptans as modifiers (ab).....	August	154
Molecular weights from mercaptan consumption (ab).....	July	132
Molecular weight of GR-S (ab).....	August	154
Monomer ratio, effect of (ab).....	March	164
Neoprene latices, coagulation of (ab).....	June	156
Oxidation of (ab).....	April	160
Peroxides in, determination of (ab).....	October	154
Photolysis of (ab).....	August	154
Polymerization of dienes and vinyl compounds (ab).....	February	179
Resin compounded with.....	October	154
Silver salts, effect on polymerization (ab).....	August	154
Sodium catalyzed (ab).....	February	170
Sponge, blowing agent for (ab).....	November	164
Strength-temperature relations (ab).....	October	166
Structure of copolymers (ab).....	May	162
Styrene from coal.....	March	89
Styrene-Irene resins in compounding (ab).....	December	168
Styrene vinyl fatty ester copolymers (ab).....	October	166
Sulfur-olefin reactions (ab).....	May	162
Surface cracking (ab).....	June	156
Vinyl plastics, relation to.....	September	108
Vulcanization, chemistry of (ab).....	April	160

T		Month	Page
TABLE COVERS			
Place mats, polyester (pp)	June	115	
Polyethylene cover (pp)	October	110	
Vinyl butyral coated	November	112	
TABLEWARE			
Bowl, polyethylene (pp)	June	112	
Cups, plates and tumblers, styrene	July	86	
Dishes and tray, pulp filler (pp)	May	122	
Food tray, ethyl cellulose (pp)	April	115	
Individual trays, styrene (pp)	July	95	
Knives, resin-bonded, birch handles and case (pp)	October	110	
Nut bowl, phenolic (pp)	February	117	
Pie slicer, cast phenolic handles (pp)	October	109	
Plate and tumbler set, melamine (pp)	October	114	
Restaurant tableware	September	100	
Salt and pepper shakers, styrene (pp)	February	117	
Shakers, acrylic	November	108	
Tray, acrylic (pp)	July	95	
Tumbler, polyethylene (pp)	September	118	
TACHOMETERS			
Sticht, Herman E., stationery (ma)	September	210	
TAXIDERM			
Teeth and jaws, butyrate	April	238	
TENSILE STRENGTH			
Ethyl cellulose, injection molded (ab)	September	168	
Films, test for (ab)	March	164	
Machine for rigid plastics (ab)	November	164	
Static failure instrument (ab)	February	170	
TESTING			
American Instrument, heat distortion tester (ma)	June	230	
Baldwin Locomotive, fatigue testing machine (ma)	May	226	
Baldwin Locomotive Works, impact machine (ma)	July	172	
Electrical resistance	April	151	
Electron microscopy (ab)	March	164	
Flammability test (ab)	June	156	
General Electric, flow detector (ma)	April	204	
Light scattering method (ab)	April	160	
Metal detection	April	137	
Moisture gain of packages (ab)	June	156	
Specimens mounted in urea resin	October	121	
Taber Instrument Corp., abraser accessories (ma)	July	172	
Viscometer (ab)	May	162	
TEXTILE EQUIPMENT			
Bobbin, laminated (pp)	October	113	
Creel	September	148	
Laminates, use for	September	97	
TEXTILES			
Coating for, plastic (pp)	March	110	
Curtains and tablecloth, vinyl (pp)	December	118	
Flameproofing of (ab)	October	158	
German test equipment (ab)	May	162	
Insolubilizing rayon with diisocyanates	June	254	
Machinery for	July	73	
Metallic yarn with acetate	November	121	
Polyethylene fabrics	November	107	
Polyvinylidene chloride fabrics (ab)	May	158	
Polyvinylidene chloride filaments	August	89	
Quilted vinyl (pp)	March	109	
Resin treatment of	January	97	
Shrink prevention, resin for (pp)	April	118	
Vinyl plastics sheeting	November	128	
Yarn impregnating process	January	139	
THERMAL PROPERTIES			
Second-order transition of polyvinyl acetate (ab)	July	132	
Stresses in plastics, elimination of	December	153	
Thermal expansion (ab)	September	166	
Transition, second-order (ab)	September	166	
THERMOMETER			
Leeds & Northrup, bulb	April	210	
Weston electrical instrument (ma)	November	186	
TIMER			
Electronic controls (ma)	September	184	
TOLERANCES			
Standards for molding (ab)	November	160	
TOOLS			
Allied Machinists, dressing fixture (ma)	February	190	
Barron Tool, router (ma)	February	190	
Detroit Mold Engineering, bushings, reamers, plugs (ma)	October	186	
Ermac, hand saw (ma)	February	190	
Fearless Tool, rotary broach (ma)	November	186	
Hammer, soft impact, nylon (pp)	November	114	
Handles for, vinyl (pp)	February	115	
Hand-power tool, acetate	December	125	
Hedge clipper, phenolic handle (pp)	January	125	
Holub Industries, live centers (ma)	January	176	
Invincible Tool, mold makers (ma)	September	210	
Molded laminate for	June	132	
Precise Products, electric hand (ma)	January	172	
Screw driver handle, acetate (pp)	October	113	
Screw driver, nylon shaft (pp)	January	123	
Weider, phenolic case for (pp)	October	113	

TOYS	Month	Page
Animals, acetate	June	165
Animals, vinyl (pp)	March	114
Animals, vinyl coated fabrics (pp)	November	115
Auxiliary plunger transfer molding	February	121
Bank, styrene	June	166
Boat model	February	110
Boats, acetate (pp)	September	116
Brodi game, urea (pp)	February	113
Building blocks	October	103
Car kit, acetate and styrene (pp)	January	131
Car, trailer and racer, styrene (pp)	August	118
Doll, ethyl cellulose	June	165
Engine and track, butyrate (pp)	October	114
Fire engine, ethyl cellulose (pp)	November	115
Games	December	99
Golf club heads, ethyl cellulose	July	101
Gun, phenolic	June	165
Handicraft kit	October	194
Helicopter, cellulose acetate	November	182
Horse shoe game, acetate (pp)	March	114
Jungle Gym, acetate	March	96
Magic set of plastics	December	208
Plastics scissors, styrene	March	108
Poker chip rack, phenolic (pp)	August	116
Poker chips, polyethylene (pp)	May	122
Poker chips, styrene	March	190
Poker set, styrene (pp)	March	115
Poker table, phenolic	February	112
Rattles, acetate (pp)	February	113
Roadster, acetate and phenolic	April	110
Roulette wheel, phenolic (pp)	February	119
Target gun, phenolic	August	131
Telephone bank, acetate and ethyl cellulose (pp)	March	115
Tractors, acetate (pp)	February	113
Train, ethyl cellulose (pp)	January	119
Train whistle, cellulosic (pp)	November	115
Truck, acetate	February	104
Tumbler, acetate (pp)	January	119
Washing machine, acetate, ethyl cellulose	March	117
TRANSFER MOLDING		
Auxiliary plunger transfer molding	February	121
Siphon head, improvement of	October	104
TRANSPARENT PLASTICS		
Spectral transmission of	May	156
TRUCK		
Lewis-Shepard, with plastics wheels (ma)	May	224
TUBING		
Ureas for extruded	October	123
UMBRELLA		
Parts for, acetate and nitrate (pp)	May	120
UPHOLSTERY		
Automobile, polyvinylidene chloride (pp)	December	113
Butyral coating for	September	126
Chair covering, vinyl (pp)	January	126
Chair covering, vinyl (pp)	December	117
Stainproof furniture, vinyl (pp)	January	122
Vinyl plastics for	September	123
UREA PLASTICS		
Automobile bodies, resin-bonded	June	174
Cast gypsum-urea articles	March	103
Condensation resins	February	161
Cosmetic containers	December	96
Expansion plans	January	98
Games, molded parts	December	96
Housings of	March	126
Injection molding	May	135
Kinetic study of reaction (ab)	August	152
Kitchen articles	September	99
Laminates, German	October	148
Lighting fixtures	May	178
Preparation, German method	May	153
Production in 1945	October	125
Production statistics	February	133
Production statistics	April	234
Production statistics	May	198
Production statistics	June	208
Production statistics	July	154
Production statistics	August	168
Razors	September	104
Resin-bonded plywood	July	123
Silverware chest	February	97
Specimen mounting	October	121
Stabilizer (ab)	August	150
Statistics for 1946	January	103
Structure of urea resins (ab)	December	170
Supply outlook of	November	124
Use in making compreg	February	159
Wood treatment with	October	150
VACUUM CLEANERS		
Molded parts	February	106
Moth-killing attachment, acetate	August	101
VACUUM COATING		
National Research (ma)	September	184
VENTILATOR		
Housing for, urea (pp)	December	119
VINYL ALCOHOL POLYMERS		
Structure of (ab)	January	164
VINYL ETHER POLYMERS		
Aryl type, polymerization (ab)	March	158
German manufacture of	January	159
Isoamyl vinyl ether (ab)	September	164

VINYL ETHER POLYMERS (Continued)	Month	Page
Isobutyl vinyl ether (ab).....	September	164
Review of (ab).....	April	156
VINYL PLASTICS		
Accordion parts.....	August	98
Anatomical specimen preservation.....	December	127
Besch accessories.....	June	210
Brushes of.....	December	105
Building blocks.....	October	103
Butyl vinylbenzoate (ab).....	March	158
Butyl coated tablecloths.....	November	112
Cast sheeting of.....	November	128
Chloride-ether copolymers (ab).....	May	158
Compounding and fabrication of (ab).....	November	160
Compounding of.....	February	137
Covers of.....	May	113
Decorative uses.....	May	125
Dip coating.....	July	156
Discoloration of (ab).....	July	158
Douglas DC-6, uses on.....	October	90
Dyeing.....	August	124
Ether ester plasticizers.....	December	163
Extruded vinyl, use of.....	December	208
Extrusion of.....	October	141
Flexible moldings.....	April	127
Floor tile, laminated.....	April	123
Flowers of.....	February	130
Fluorescent light fixture.....	February	102
Folding doors of coated fabric.....	December	129
Free radical polymerization (ab).....	March	162
German methods and uses (ab).....	May	160
Handbag adhesive.....	November	105
Hat box.....	September	178
Hinge.....	September	190
Hospital uses of.....	November	99
Latex coating material.....	October	117
Latex, properties of.....	April	122
Manufacturing processes (ab).....	August	150
Martin airliners, uses on.....	October	95
Merchandising of vinyl sheeting.....	April	109
Methyl vinyl ketone (ab).....	March	162
Molding of (ab).....	October	158
Monofilaments, uses of.....	August	89
Office equipment, use in.....	November	133
Packaging fruit.....	February	126
Paste forming resin.....	August	108
Paste, uses of.....	June	111
Pepsi-cola dispenser display.....	August	102
Phonograph records.....	July	107
Pipes for chemical plants (ab).....	December	168
Plasticizers for Messamoll.....	March	154
Plasticizers from coal.....	March	80
Plasticizer, petroleum.....	October	198
Polymerization of.....	February	162
Polymerization velocity constants (ab).....	June	156
Polyperfluorovinyl chlorides (ab).....	June	154
Polyvinylamines (ab).....	August	150
Powder metallurgy, use in.....	June	106
Printed laminates.....	February	125
Production in 1945.....	October	125

VINYL PLASTICS (Continued)	Month	Page
Production statistics.....	February	133
Production statistics for 1946.....	March	119
Production statistics.....	April	234
Production statistics.....	May	198
Production statistics.....	June	208
Production statistics.....	July	154
Production statistics.....	August	168
Rate of polymerization (ab).....	March	162
Rubber industry, relation to.....	September	106
Sawing.....	March	148
Sealing caps and sleeves.....	October	101
Statistics for 1939-47.....	January	107
Supply outlook of.....	November	124
Train interiors.....	July	80
Upholstery, butyl.....	September	126
Upholstery, vinyl.....	September	123
Vacuum cleaner parts.....	February	106
Vinyl carbazole in Germany.....	November	151
Vinylcyclohexene, polymerization of (ab).....	April	158
Vinyl fluoride (ab).....	May	158
Vinyl pyridine-styrene copolymers (ab).....	August	154
Vinylthiophene (ab).....	May	160
WISE		
Machinists Tool, precision vise (ma).....	December	192
VULCANIZED FIBRE		
Are interrupter devices.....	July	88
Review of.....	February	121
WATER ABSORPTION		
Fibers (ab).....	September	168
Graphic analysis of (ab).....	August	154
Vinyl chloride plastics (ab).....	July	132
WAXES		
Microcrystalline, uses of (ab).....	March	158
WEATHERING TESTS		
Pitfalls in (ab).....	October	164
Rubber aging (ab).....	October	164
WELDING EQUIPMENT		
DoALL Co., flash butt welder (ma).....	November	184
Radio Receptor, for thermoplastics (ma).....	January	174
WINDOWS		
Cellulose acetate, mesh reinforced.....	December	110
WOOD		
Effect of acids on.....	July	123
Impregnated and compressed products (ab).....	February	168
Laminated wood, glue-line stresses in (ab).....	September	166
Nitrated constituents of (ab).....	November	162
Stabilization by acetylation (ab).....	July	134
Staywood, heat stabilized (ab).....	September	166
Urea resin-forming treatment.....	October	150
Use in making compreg.....	February	159

3 INDEX OF AUTHORS

AUTHORS	Month	Page
A		
ABBIATI, F. A. Christmas with plastics.....	December	90
ADAMS, C. H. Properties of melamine and phenolics.....	May	151
AKIN, RUSSELL B. Extrusion technique.....	October	134
AIKEN, WM. Thermoplastic specialty resins.....	February	100
ALBERT, GERARD A. Vulcanized fibre in arc devices.....	July	88
ALFERS, JOHN B. Flameproofing laminates.....	March	151
B		
BABCOCK, GLEN E. Resorcinol glue extender.....	April	153
BAILEY, JAMES. Extruding acrylic.....	December	131
BAILEY, JAMES. Annealing of styrene.....	October	127
BAYER, OTTO. Polyurethanes.....	June	149
BERLINER, J. F. T. Cold-pour plastics.....	March	103
BIGGERS, J. B. Oil purifying systems for molding plants.....	June	186
BOINEY, J. F. Rubber-resin compounds.....	October	154
BOYDEN, C. W. Controls in molding.....	May	194
BRODERSON, NEILO. The S.P.I. looks to the future.....	January	92
BURLESON, N. VINYL paste resin.....	August	108
C		
CALLOMON, I. G. German phenolic molding compounds.....	September	160
CALLOMON, I. G. German manufacture of laminates.....	October	147
CARMEN, P. H. Plastics supply outlook.....	November	121
CHAMBERLAND, H. J. Sawing vinylidene chloride.....	March	148
CHAMBERLAND, H. J. Friction cutting plastics.....	August	135

AUTHORS	Month	Page
D		
CHAPMAN, J. J. Measuring electrical resistance.....	April	151
COLES, HAROLD W. Plastics as optical cements.....	June	141
CURRY, FRANCIS P. Plastics as optical cements.....	June	141
D		
DARLING, WILLIAM B. Paper plastic surfacing.....	October	97
DEARLE, D. A. Molding plant schedule.....	February	150
DEBELL, GEORGE W. Molded hollow thermosets.....	April	143
DELOLLIS, N. J. Effect of pH on plywood strength.....	July	123
DELMONTE, JOHN. Photodielectric analysis of materials.....	February	163
DEUBERRY, HARRY B. Plastics as optical cements.....	June	141
DUNLAP, RALPH I., JR. Heat resistant polystyrene.....	August	127
E		
ERBE, PAUL E. Casting plastics.....	November	153
F		
FARR, W. W. Ridge forming acrylic sheet.....	July	114
PEDAN, SIDNEY H. Nitrate covering for propellers.....	November	142
FERGASON, CARL M. Cotton web for laminates.....	September	153
FIEDLER, E. F. Spectral transmission of plastics.....	May	156
FIKENTSCHER. Spray polymerization of vinyl ethers.....	February	162
FORMO, JEROME. Preheating plastics with live steam.....	February	141
FRANKLIN, P. H. Cast resin for electric circuits.....	July	99
FULLER, PRESCOTT. Restaurant tableware.....	September	100
FURGASON, CARL M. Flameproofing laminates.....	March	151

AUTHORS	Month	Page
G		
GAETH, Spray polymerization of vinyl ethers....	February	162
GLICK, SANFORD E. Heat resistant polystyrene	August	127
GREENMAYER, PAUL A. Metal detection.....	April	137
GREY, JAMES T. Casting plastics.....	November	153
H		
HOFFMAN, PAUL R. Whither low pressure mold- ing?	April	99
HOYLER, H. F. Controls in molding.....	May	194
I		
INGLE, GEORGE W. Three dimensions of color..	May	131
K		
KENNEDY, W. B. Honeycomb structures.....	September	129
KENNEY, R. P. Plastics and rubber.....	September	106
KESTER, E. B. Plasticizers for vinyls.....	December	163
KEVILLE, J. J. Cellulose propionate in the field...	January	127
KLINE, G. M. German phenolic molding com- pounds.....	September	160
KLINE, G. M. German manufacture of laminates.	October	147
KLINE, G. M. German polyvinyl carbazole.....	November	157
KLINE, G. M. German manufacture of polyvinyl ethers.....	January	159
KLINE, G. M. Effect of pH on plywood strength..	July	123
L		
LANDES, W. STUART. Trends in the plastics in- dustry in 1947.....	January	110
M		
MARTINELLI, A. C. Polystyrene in refrigerators.	November	122
MILLETT, MERRILL A. Urea resin-forming sys- tems.....	October	150
MILLETT, MERRILL A. Urea resins for making compreg.....	February	159
MISKELLY, RAYMOND E. Nylon rope.....	August	121
MOHRMAN, H. W. Properties of melamines and phenolics.....	May	151
MORASH, NORMAN. Molding laboratory.....	September	176
MOSS, FRANK. Glass fabric reinforced plastics..	December	142
MOULTON, M. S. Coating with vinyl latex.....	October	117
MOXNESS, S. K. Preheating plastics with live steam.....	February	141
N		
NEUGASS, EDWIN A. Acrylic brush backs.....	April	134
NOFFMAN, PAUL R. Whither low pressure mold- ing?	April	99
NORTON, ARTHUR J. Plastics in plywood.....	November	89
O		
O'KANE, R. G. Fabricating acetate.....	March	138
P		
PAINTER, E. V. Cotton webs for laminates.....	September	153

AUTHORS	Month	Page
PEARSON, HENRY F. Acrylic jewelry.....	April	128
PHILLIPS, EDWIN S. Polishing squares.....	November	150
POWTER, N. B. Canadian lignin plastic.....	April	106
PYLE, J. J. Spectral transmission of plastics.....	May	156
R		
RAPPOLT, HERMAN G. Heat operations.....	November	135
RASKIN, B. L. Measuring electrical resistance...	April	151
REINHART, F. W. Effect of pH on plywood strength.....	July	123
RHODES, PHILIP H. Reactivity of resorcinol res- ins.....	August	145
RINKER, R. C. Effect of pH on plywood strength.	July	123
RICE, R. B. Spectral transmission of plastics.....	May	156
S		
SANDLER, JACK. Compounding plastic materials	February	137
SCHEUERMANN, H. Condensation products of formaldehyde.....	February	161
SCHWAB, Spray polymerization of vinyl ethers...	February	162
SCHULZ, WALTER F. Plastics as optical cements	June	141
SHEPARD, A. F. Rubber-resin compounds.....	October	154
SLAYTER, GAMES. Glass fabric reinforced plas- tics.....	December	143
SMITH, A. K. Resorcinol glue extender.....	April	153
SNYDER, E. H. Acrylic edge attachment.....	September	138
STAMM, ALFRED J. Urea resin-forming systems.	October	150
STAMM, ALFRED J. Urea resins for making com- preg.....	February	159
STANTON, ROBERT B. Thermoplastic rubber..	April	126
STRAUSS, HARRY L., JR. Polyvinyl acetate in powder metallurgy.....	June	196
T		
TELFAIR, D. Properties of melamine and pheno- lics.....	May	151
TOMLINSON, R. Ridge forming acrylic sheet...	July	114
TURNER, P. S. Thermal expansion of plastic....	December	153
TUTTLE, E. J. Plasticizers for vinyl coatings...	December	163
TUTTLE, O. S. Honeycomb structures.....	September	129
V		
VILA, GEORGE R. Resin treatment of fabric....	April	118
VON DER HORST. Mesamoll plasticizers.....	March	154
W		
WEINBERG, M. Cast resin for electric circuits...	July	99
WEISS, PHILLIP. High frequency heat sealing equipment.....	August	138
WILCOX, T. N. Dielectric preheating.....	March	131
WILLIAMS, SIMON. Flameproofing laminates...	March	151
WILLIAMS, FRANK C. Mesh reinforced plastic...	December	110
WILLIAMS, SIMON. Cotton webs for laminates...	September	153
WITT, R. I. Measuring electrical resistance.....	April	151
WITTMAN, LAWRENCE. Better Tools from molded laminates.....	June	132
Y		
YOUNG, ROBERT. Contouring of honeycomb sec- tions.....	May	140



LOOKING FOR IDEAS *In* *Plastics?*

If you are interested in the many new and fascinating things that are being done with plastics, you should subscribe to **MODERN PLASTICS MAGAZINE**; for this magazine is the leading publication in the plastics industry. It is colorful, profusely illustrated and averages more than 286 pages every single month.

MODERN PLASTICS is jam-packed with ideas that penetrate practically all industries with suggested uses, processing methods and plastic materials. This magazine is the real authority on the latest developments, techniques and processes. It points out how plastics can do jobs better with plastics, can increase sales, how plastics can save raw material costs, how plastics open up new markets and how plastics will do jobs that cannot be duplicated by any other material.

MODERN PLASTICS is available to you at a low cost. Imagine reviewing 286 pages jam-packed with ideas for less than 50c every month. On a 2-year basis you can get this volume of ideas every month for less than 30c. You cannot afford not to read



MODERN PLASTICS if you want to keep informed on the many new and exciting developments in this industry.

4 MAGAZINES IN ONE

THE GENERAL SECTION —

carries stories of new applications, materials, theories of design, selling and merchandising. It is full of ideas for adapting plastics for entirely new purposes.

TECHNICAL SECTION —

for the advanced engineer or chemist who wants to know the chemistry, techniques, formulae of many new or improved materials. Written by authorities in the field of chemistry.

PLASTICS ENGINEERING SECTION —

explores new production methods, analyzes costs, tells how to set up new production schedules and explains new and improved processing or fabrication operations.

NEWS AND FEATURES —

contains latest news of the industry itself, illustrates new plastics products, books, machinery and equipment. Lists stock molds and products therefrom.

MAIL YOUR SUBSCRIPTION NOW

Modern Plastics Magazine

122 East 42nd Street, New York 17, N. Y.

Gentlemen:

I would like to keep up with the many new developments in plastics. Please start my subscription immediately. I would like to subscribe for one year at ☐ \$5.00; two years at ☐ \$8.00. (Foreign: \$6.00 for 1 year, \$10.00 for 2 years. Canadian: \$5.50 for 1 year, \$9.00 for 2 years.) ☐ Please send me more information about the **MODERN PLASTICS MAGAZINE**.

Name _____

Company _____

Address _____

City _____

Zone _____

State _____

Your Position _____

47 IND

MODERN PLASTICS MAGAZINE



122 East 42nd Street

New York 17, N. Y.

